

The Evolution of a “Peculiar Landscape”

Coal Mining, Management and Mitigation on the River Devon 1792-2014

Submitted by Jennifer L. Geller to the University of Stirling as a dissertation toward the degree of Master of Historical Research (Environmental), August 2014.

I certify that all material in this dissertation which is not my own work has been identified and that no material is included for which a degree has previously been conferred on me.

Abstract

This dissertation relies on the original definition of an edgelands proposed by Marion Shoard, but seeks to expand this concept to include the natural and cultural qualities that identify and describe their evolution. The primary aim of this study is to formalize the concept of edgelands in order to better preserve their legacy. In order to accomplish this goal, the study focusses on the natural and cultural evolution of the site of the former Devon Colliery and Iron Works, located in Clackmannanshire, Scotland, between 1792 and 2014. Historical records as well as scientific data are used to examine the impact of coal mining on the site's environment. The story of the site is then used to analyse the processes which create, maintain, and transform edgeland spaces. Four criteria are used to define edgeland status: the location and physical qualities of the Devon Colliery site, management practices used at the site, the site's environmental quality, and finally, the public and legislative response to this environmental quality. These criteria are examined in each of five chronological periods covering the life of the site.

Chapter One argues that the Devon Colliery evolved as an edgeland due to the tension between the natural, physical characteristics of the site and changes in the built environment over the course of its history. In Chapter Two, the tension between the desire for profit and protection of the environment is hypothesized to have resulted in the site's edgeland status. Chapter Three explores the relationship between environmental quality and edgeland designation, concluding that edgelands cannot necessarily be measured by their environmental quality. Finally, Chapter Four examines the role of legislation of coal waste, water pollution and local planning authority in creating edgelands, concluding that they are both created and perpetuated by the public's disregard for them.

The dissertation concludes by reviewing the ways in which each theme contributes to an expanded conceptualization of edgelands. It sets the story of a single, local edgeland in its national and international context. A guideline for managing edgelands that preserves their characteristic tensions is established. Finally, the successful use of this guideline for preserving the legacy of the Devon Colliery edgeland is demonstrated.

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Introduction

In 2002, Marion Shoard introduced the concept of edgelands, naming them the “peculiar landscape.”¹ Located beyond urban centres, not quite rural, yet still isolated, oftentimes a wasteland of former or neglected industrial activity, sometimes unregulated and unmanaged,² edgelands are ambiguous, contested and difficult to categorize³ and as such, capture our imagination as well as our desire to define and quantify. Further popularized by Paul Farley and Michael Roberts in their elegy to edgelands published in 2011,⁴ the increasing awareness of these spaces in between may indicate the coming of age of a generation who grew up not under the gritty pall of industrialization, but under the fear and uncertainty of de-industrialization. What are edgelands to us who only know of the closing of mills and mines, of industrial abandonment and dereliction? Do we use these landscapes to romanticize a past whose struggles we cannot even begin to fathom, or do these landscapes represent for us a means by which we can begin to understand the legacy of an environment that exists for us only as a faint memory?

Despite their contemporary designation, edgelands have existed at the intersection of nature and culture ever since the industrial revolution began to transform the British landscape in the late eighteenth century. Estate owners, including the Erskines of Clackmannanshire, Scotland had begun to take an interest not only in the new and improved agricultural techniques that had helped spawn “the improvement” across Scotland in the mid-eighteenth century, but also in other forms of income-generating activities including early

¹ Marion Shoard, ‘Edgelands’, in Jennifer Jenkins (ed.), *Remaking the Landscape: The Changing Face of Britain* (London, 2002), p. 117.

² Shoard, ‘Edgelands’, pp. 117, 123.

³ Mattias Qviström and Katarina Saltzman, ‘Ambiguous Edgelands: Landscape Studies Beyond Rural–Urban Divides and Disciplinary Trench-lines’, *Urban Forestry & Urban Greening*, 7 (2008), p. 143. (accessed online); Ebba Lisberg Jensen and Pernilla Ouis, ‘Contested Construction of Nature for City Fringe Outdoor Recreation in Southern Sweden: The Arrie Case’, *Urban Forestry and Urban Greening*, 7 (2008), p. 171. (accessed online).

⁴ Paul Farley and Michael Roberts, *Edgelands: Journeys into England’s True Wilderness* (London, 2011).

forms of industry, especially mining.⁵ Located just three miles from the nearest population centre and the seat of the Erskine estate in Alloa, yet with a panoramic view of the Ochils to the north and set on the south bank of the “clear winding Devon,”⁶ the Devon Colliery would have been an anomalous blip on the landscape, sending out shoots of industrialization including the adjacent Devon Iron Works founded in 1792. Nevertheless, the colliery remained physically isolated; presumably producing primarily for the Iron Works.⁷ Despite the Erskines’ mine manager, Robert Bald’s efforts to reduce coal waste,⁸ mining still resulted in an environment which did not fit seamlessly into the surrounding agricultural landscape. The ambiguity in this landscape lay in the fact that it contained within its boundaries the means to industrialization, yet the profits produced there were subsequently used to enhance an established agricultural estate, thereby creating the origins of this particular location as an edgeland.

⁵Baron F. Duckham, *A History of the Scottish Coal Industry, Volume 1: 1700-1815, A Social and Industrial History* (Newton Abbot, 1970).

⁶Robert Burns, ‘The Banks of the Devon’ (1787), http://www.bbc.co.uk/arts/robertburns/works/the_banks_of_the_devon/. [Accessed 6 February 2013].

⁷Duckham, *A History of the Scottish Coal Industry*, pp. 149-150.

⁸John Carvel, *One Hundred Years in Coal: The History of the Alloa Coal Company* (Edinburgh, 1944), p. 16; Robert Bald, *A General View of the Coal Trade of Scotland, Chiefly that of the River Forth and Mid Lothian* (Edinburgh, 1808), p. 47

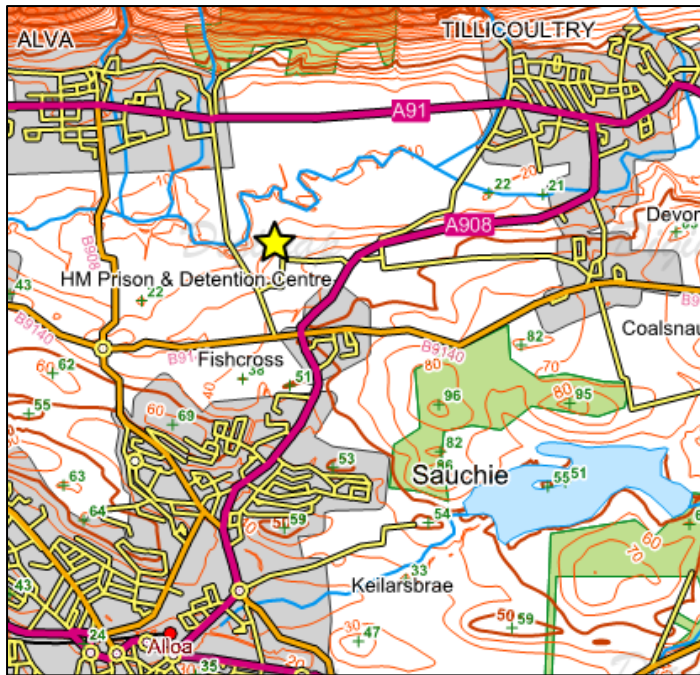


Fig. 1: Site of the abandoned Devon Colliery⁹

Today, although little remains to mark the existence of the former Devon Colliery (see fig. 1), the area is still clearly discernible as an edgeland. What this means in a contemporary context, according to Shoard’s definition, is that the former Devon Colliery site represents an “interfacial rim”¹⁰ separating settlements including Alva, as well as the smaller villages of Alva and Tillicoultry, from the countryside. While these population centres still do not encroach upon the site, the haphazard farms tucked next to the site and the existence of the Scottish Society for the Prevention of Cruelty to Animal’s (SSPCA) wildlife rescue centre certainly do not make it a pristine, rural location. Thus the area is neither urban nor rural with the River Devon itself serving as an ambiguous boundary between the poorer grazing land which replaced the mine on the south bank and the more aesthetically-pleasing carseland

⁹ ‘Fishcross’, Ordnance Survey/Edina supplied service (2014), <http://digimap.edina.ac.uk/roam/os>. [Accessed 25 July 2014].

¹⁰ Shoard, ‘Edgelands’, p. 117.

on the north bank. The various incarnations of the site following abandonment by the National Coal Board (NCB) in 1960 up to the present fit Shoard's description of edgelands as places that are "...not designed from scratch," rather they "...assemble themselves in response to whatever needs are thrust upon them"¹¹ as clearly the original purpose of the mine site was not grazing, horseback riding, or wildlife rescuing.¹² The question then becomes: how do these edgelands evolve? What are the processes that create, maintain and transform these environments? Does the contemporary conceptualization of edgelands allow for analysis of environmental change over time, taking into consideration factors including pollution, management and mitigation that may challenge the original concept of the peculiar landscape?

As deindustrialization progressed across Britain throughout the late twentieth century, debates about its industrial heritage began to smoulder like the coal tips left in its wake. Mining has become the lightning rod for the polarization of its legacy with the resulting edgelands representing the poles of the debate, setting the idea of dereliction as a positive expression of cultural identity against dereliction as a symbol of oppression, dislocation and loss.¹³ Scottish coal mines, particularly those in a region such as Clackmannanshire which contained no major urban centres yet plenty of industrial activity over the course of the past two centuries serve as the ultimate setting for a debate about edgelands and their legacy. In

¹¹ Shoard, 'Edgelands', p. 123.

¹² Stirling Council Archives, Central Regional Council, Land and Buildings Committee, Report by Estates Manager, LB 113, CR1/1/10, 20 September 1979; Stirling Council Archives, Central Regional Council, Land and Buildings Committee, Devon Colliery Rehabilitation Site—Proposed Cross-Country Horse Course—British Horse Society—Report of Interest by British Horse Society, LB9, CR1/1/22, 9 May 1985; Keith Johnstone, 'Report of handling on planning application-Demolition of existing Devon Equestrian Centre Building and construction of SSPCA National Wildlife Centre with 2 houses for management accommodation at Equestrian Centre, Fishcross, Planning Committee, 2 September 2010', <http://www.clacksweb.org.uk/council/reports/?title=equestrian+centre&author=&bodyid=&catid=&fromm=&fromy=&tom=&toy=&so=category&sub=1>. [Accessed 10 April 2014].

¹³ For writing in favour of dereliction as a positive expression, see for example Gavin Bridge, 'Contested Terrain: Mining and the Environment', *Annual Review of Environment and Resources*, (29) 2004, pp. 205-259, and Tim Edensor, *Industrial Ruins, Space, Aesthetics and Materiality* (Oxford, 2005). For support of dereliction as a symbol of loss, see Arn Keeling and John Sandlos, 'Environmental Justice Goes Underground? Historical Notes from Canada's Northern Mining Frontier', *Environmental Justice*, (2) 2009, pp. 117-125 (accessed online) and Christopher S. Davies, 'Wales: Industrial Fallibility and Spirit of Place', *Journal of Cultural Geography*, (4) (1983), pp. 72-86.

order to make the case for the importance of edgelands' legacy, this study focusses on natural and cultural changes wrought by coal mining along the stretch of the River Devon associated with the former Devon Iron Works and Colliery between 1792 and 2014. Formalizing the concept of edgelands using an interdisciplinary approach has important implications for the future development and management of these spaces as symbols of Scotland's industrial heritage.

Historical Context

Between 1792 and 1835, agricultural development and changes in land use by estate owners proved to be the essential ingredient in the subsequent development of British as well as Scottish industry. In order to finance capital investments in agriculture, estate owners took advantage of local mineral resources, especially coal, located close to navigable water ways on their own land.¹⁴ The establishment of this primary relationship between land, coal, transportation and technology proved critical for the ways in which the early years of the industrial revolution played out in Britain. Throughout the nation, the more widespread application of steam technology after 1780 went hand in hand with the greater need for iron machinery, in part, especially by the 1830's, to serve new transportation networks needed to get an increasing number of manufactured goods to market.¹⁵ Of course, iron making relied on coal for its creation, and once again the relationship between the location of industry and cheap coal became paramount not only in the larger British context,¹⁶ but also in Scotland where "...to speak of coal is automatically to speak of iron."¹⁷ Quantities of iron produced reflected the quantities of coal consumed: total production of coal in Britain in 1830 was 30

¹⁴ Peter Mathias, *The First Industrial Nation: An Economic History of Great Britain 1700-1914* (London, 1969), p. 10.

¹⁵ *Ibid*, pp. 121, 129.

¹⁶ *Ibid*, p. 129.

¹⁷ Duckham, *A History of the Scottish Coal Industry*, p. 184.

million tons, rising to 65 million in 1856,¹⁸ while over 2 million tons of iron was produced by 1850, up from 100,000 tons produced in 1802.¹⁹ In Scotland, the close relationship between coal and iron established in the eighteenth century exploded between 1830 and 1844, with the number of furnaces increasing from 27 to over 100 in that time period.²⁰ However, unlike the rest of Britain where increasing urbanization followed industrialization by the 1840s,²¹ in Scotland, according to Baron Duckham, “the factory system and urbanisation...had no parallel in mining.”²² Thus, a “curious montage” of the old and the new, located in a “sort of countryside rather than in a town”²³ began to establish collieries in this particular region as edgelands by the 1830’s.

By mid-century, the need to expand coal production to keep up with demands for iron along with improved technology including the use of steam power to wind coal to the surface²⁴ meant that coal pits became deeper, larger and more costly. Many shafts were sunk over 1000 feet and would take three years to win.²⁵ Nationally, 110 million tons of coal were produced in 1870, 180 million in 1890 and 290 million tons by 1913.²⁶ Corresponding to the unrelenting increases in production around this time was increasing action taken on the part of the public as well as policy-makers on the polluting impacts of unrestrained industrialization. Deeper pits and the increasing mechanization needed to win them meant that more coal waste was carried to the surface²⁷ and that greater amounts of coal dust were

¹⁸ Mathias, *The First Industrial Nation*, p. 245.

¹⁹ *Ibid*, p. 247.

²⁰ R. H. Campbell, *Scotland Since 1707: The Rise of an Industrial Society* (Edinburgh, 1985), p. 97.

²¹ Mathias, *The First Industrial Nation*, p. 226

²² Duckham, *A History of the Scottish Coal Industry*, p. 313.

²³ *Ibid*.

²⁴ Roy Church, *The History of British Coal Volume 3: 1830-1914* (Oxford, 1984), p. 5.

²⁵ Mathias, *The First Industrial Nation*, p. 244.

²⁶ *Ibid*, p. 377.

²⁷ John McManus, ‘Impacts of Coal Mining and Abandonment,’ in C. Galbraith and J. Baxter (eds.), *Energy and the Natural Heritage* (Edinburgh, 2008), p. 29.

created.²⁸ Cresting coal production resulted in peaking waste tips, or bings, as they were known in Scotland,²⁹ further transforming mining landscapes. That industrial transformations such as these could be damaging to the environment and harmful to the public health was a notion that had begun to stir in the public consciousness as early as the 1840's;³⁰ however, even by 1876, the Rivers Pollution Prevention Act handed decision-making powers back to the local authorities who were still reluctant to enforce an Act in which manufacturers and others needed only to show they had taken "the best practible and reasonably available means to avoid polluting a river."³¹

According to Harold Platt, by the turn of the century, Progressives recognized the need to make physical improvements to environmentally degraded parts of urban areas resulting in an increase in regulation which finally improved urban conditions after nearly three generations of struggle.³² However, Progressive regulatory successes were qualified by the fact that energy consumption, hence, coal production, actually increased simultaneously.³³ This, along with the fact that coal mine waste was not regulated as such until the Mines and Quarries (Tips) Act of 1969³⁴ meant that policy and legislation served to maintain collieries as edgeland, or as Shoard would describe, a "repository for functions we prefer not to think about"³⁵ well into the twentieth century. Mining sites underwent a brief period of attempted transformation away from edgeland status as a result of NCB take over and subsequent modernization practices in 1946,³⁶ but as mines were abandoned across Britain throughout the second half of the twentieth century these former coal pits reverted to their edgeland

²⁸ Church, *The History of British Coal Volume 3*, pp. 344-358.

²⁹ McManus, 'Impacts of Coal Mining and Abandonment', p. 29.

³⁰ T. C. Smout and Marie Stewart, *The Firth of Forth: An Environmental History* (Edinburgh, 2012), pp. 146-148.

³¹ *Ibid*, p. 155.

³² Harold L. Platt, *Shock Cities: The Environmental Transformation and Reform of Manchester and Chicago* (Chicago, 2005). p. 498.

³³ *Ibid*.

³⁴ c. 10, Mines and Quarries (Tips) Act 1969.

³⁵ Shoard, 'Edgelands', p. 119.

³⁶ *A Short History of the Scottish Coal Mining Industry*, (The National Coal Board, 1958), pp. 85-88.

roots. Even mitigation powers granted to Scottish local authorities by the 1975 Town and Country Planning Act³⁷ could not transform these spaces.

Patterns and themes of early industrialization in Clackmannanshire beginning in 1792 mirrored more national trends in the growth of British industry at the time, yet thanks to the efforts of the Erskine family, developments particular to Clackmannanshire began to set it apart as a unique environment even before the full onslaught of industrialization was felt nationally. In 1835, John Francis Miller Erskine, following the general British trend of the decline of the importance of established land owners in mining interests,³⁸ leased his pits, including Devon Colliery, to the newly-formed Alloa Coal Company.³⁹ By 1880, responding as did the rest of Scotland and Britain to the greater demand for coal, Alloa Coal had sunk a 600 foot shaft⁴⁰ and had invested heavily in other mining infrastructure⁴¹ in order to begin mining on a truly industrial scale virtually in the middle of land which was still otherwise primarily agricultural in nature. The impact of such substantial anthropogenic activity on the site's environment over the course of a mere half century played an enormous role in maintaining the space as a Victorian edgeland, set apart from villages like neighbouring Tillicoultry which sought burgh status in 1871 with the express purpose of ameliorating some of the impacts of humans on the environment, including sanitation and water supply.⁴² However, it was not until 1893 that any part of the significant pollution on the River Devon was attributed to coal mining.⁴³ Harold Platt's notion of separate spheres segregating classes by environmental quality in Victorian Manchester⁴⁴ may provide some clues as to why little attention was paid to mine waste from the Devon Colliery. Residents of Alva and Tillicoultry

³⁷ c. 33, Town and Country Planning (Scotland) Act 1975.

³⁸ Church, *The History of British Coal Volume 3*, p. 12.

³⁹ Carvel, *One Hundred Years in Coal*, p. 2.

⁴⁰ 'Operations at Devon', *Alloa Advertiser*, 1 May 1880.

⁴¹ *Ibid*; 'Extensive Mining Operations at Devon', *Alloa Advertiser*, 9 September 1882.

⁴² Eric J. Evans, *Tillicoultry A Centenary History: 1871-1971* (Tillicoultry, 1972), p. 10.

⁴³ National Archives of Scotland, Report on Pollution of the River Devon, by the County Medical Officer of Clackmannanshire, to sub-committee appointed by the County Council as District Committee to consider the subject: The Devon, DD13/2662, 10 December 1893.

⁴⁴ Platt, *Shock Cities*, p. 53.

may have found it easy to ignore environmental impacts that were so close, yet so far away, as long as their own spheres were pollution-free. This lack of local intervention, then, would have played a significant role in maintaining the Devon Colliery site as an edgeland into the early twentieth century and beyond, when despite tighter regulations, the site remained unmitigated for more than fifteen years following abandonment by NCB in 1960.⁴⁵

From the time of its inception as an industrial base in an otherwise agricultural setting through its maintenance as a “space between” as a result of private management and public regulation and response and on into its attempted transformation through mitigation, then, the site of the former Devon Colliery can be defined as edgeland according to four criteria: location and landscape transformation, management and planning, environmental quality and change, and environmental regulation and public response. Once these criteria have been used to identify and define the evolution and legacy of the Devon Colliery scientifically and culturally, they could then be applied to other locales and can be used to create management strategies which could help preserve the legacy of this “peculiar landscape” for the future. A chapter is dedicated to each of four criteria used to define edgeland status; first, the location of the site will be considered geographically, geologically and topographically. Then, planning and management practices by the Erskines and Balds, the Alloa Coal Company, the National Coal Board, the Central Regional Council, and the Clackmannan District Council will be examined and the consequences of their decisions for the site’s environment will be analysed. This will be followed by a description of the environmental quality of the site, including the impact of mining on the River Devon, the site’s soil quality, and its morphology. Finally, the public response to the environmental quality of the site, including policy, legislation and regulation and its impact on the Devon Colliery site will be explored. The first three chapters will analyse the evolution of its particular criteria from the initial

⁴⁵ National Archives of Scotland, NCB Scottish Division—Secretariat: Closure of Collieries: Devon, CB276/14/1, 30 March 1960.

creation of the edgeland by Erskine and Bald between 1792 and 1835, through the maintenance of the space by Alloa coal from 1835 to 1880, and the ways in which policy and legislation continued to maintain the status of the site from 1880 to 1946, followed by the attempted transformations and subsequent neglect by NCB between 1946 and 1977, and finally ending with the mitigation efforts that did not ultimately result in the loss of the site's edgeland status between 1977 and the present. The final chapter is organized thematically around legislation for and public response to coal waste, water pollution and local authority and their relationship to the notion of an edgelands over the course of the two hundred year history of the mine.

Historiography

The concept of contemporary edgelands is a fairly recent one. Although the type of space now referred to as edgeland, or “wildscape,” in its more recent incarnation⁴⁶ was first described by Richard Mabey in 1973,⁴⁷ the implications for these spaces other than places of post-industrial decay were not explored until Marion Shoard's 2002 essay.⁴⁸ The four perspectives from which Shoard addresses edgelands in this essay as well as in her current work are those which have been adopted by this study as criteria for evaluating edgeland status. According to Shoard, location and landscape evolution are the most basic criteria for determining edgeland or wildscape status. She notes: “[U]rban wildscape occurs on the outer edge of settlements for particular reasons which do not obtain in town and city centres or even the suburbs,”⁴⁹ and points out the importance of the ways in which these landscapes become transformed. True urban wildscapes, for Shoard, are “spaces which have become wild of their own accord, because no human hand has moulded them into something else,” as

⁴⁶ Marion Shoard, ‘A Call to Arms’ (2013). <http://www.urbanwildscapes.org/wp-content/uploads/2011/09/UW-Marion-Shoard-A-Call-to-Arms.pdf>. [Accessed 15 May 2014].

⁴⁷ Richard Mabey, *The Unofficial Countryside* (London, 1999).

⁴⁸ Shoard, ‘Edgelands’.

⁴⁹ Shoard, ‘A Call to Arms’, p. 87.

opposed to “land which has been deliberately wilded.”⁵⁰ A more complex issue revolves around the management and planning of these sites. There is a paradox in the notion that if edgelands are managed more directly, they risk losing their wildscape status,⁵¹ yet if they are not managed, they may disappear altogether, subsumed as a housing estate or even a cultivated park.⁵² The environmental quality of edgelands, especially the potential changes in that quality as a result of attempts to green these spaces represents Shoard’s most fervent argument in preserving these spaces. She points out that contrary to popular notion, “important wildlife is not concentrated in the heart of the countryside” and that the places with the largest numbers of species throughout Britain are often found in post-industrial sites.⁵³ The location of edgelands is all-important for the development of this diversity, and proper planning and management are crucial for its maintenance. Finally, the issue of environmental regulation and public response encompasses the three previous themes. The attitude taken by people toward these sites exists because their location makes them so easy to ignore, even for the purposes of creating specific environmental management policies. This disregard, in turn, perpetuates their “wildness.” Public perception, then, ultimately impacts the regulation of the planning and management of these spaces.

Although he does not examine the edgeland concept as such, notions of the “liminality” of the mining environment and landscape change addressed by Gavin Bridge⁵⁴ provide an important complement to Shoard’s ideas. Bridge describes the struggle to define mining landscapes not only because of their natural and cultural transformations of the environment, but also the mental, social and ideological landscapes that result from such

⁵⁰ *Ibid*, p. 82.

⁵¹ Shoard, ‘Edgelands’, p. 139.

⁵² Shoard, ‘A Call to Arms’, pp. 83-85

⁵³ *Ibid*, p. 82.

⁵⁴ Gavin Bridge, ‘Contested Terrain: Mining and the Environment’, *Annual Review of Environment and Resources*, (29) 2004, p. 241.

transformation.⁵⁵ He recognizes how the physical geography of a mining site can create a “profound sense of dislocation” making it “morally uncertain,”⁵⁶ just as Shoard notes contemporary ambivalent attitudes toward edgelands in general. Most significantly for this study which aims to create a more historically-aware definition of edgelands, Bridge focusses on the process of change that creates the ambiguity in mining landscapes, noting particularly the perception of the disruption of “pre-industrial integrity and harmony” by mining.⁵⁷

The idea of extending the conceptualization of edgelands into the past and examining its relationship to environmental change has a basis in the historiography and methodology of environmental history. Since the early 1990s, environmental historians have debated whether or not environmental history should include the study of urban industrial areas with Donald Worster championing the rural paradigm and Joel Tarr focussing more on urban and industrial environmental change.⁵⁸ This debate resulted in a dichotomy between nature and culture created in part by Worster in which he argued that the built environment is completely separate from nature and that nature is “...an order and a process that we did not create.”⁵⁹ In 1994, Rosen and Tarr addressed this dichotomy by proposing that the evolution of the “dialectical interdependence and tension” between nature and culture must be explored.⁶⁰ Edgelands help to address the nature versus culture dichotomy because they push beyond the traditional boundaries of nature and culture. As Jensen and Ouis note, they are “neither nature or culture.”⁶¹ The impact of the intersection of the natural, geographic and geologic location of the Devon Colliery and the industrial infrastructure of the mine’s built

⁵⁵ *Ibid.*

⁵⁶ *Ibid.*, p. 242.

⁵⁷ *Ibid.*, p. 243.

⁵⁸ Stephen Mosley, *The Chimney of the World: A History of Smoke Pollution in Victorian and Edwardian Manchester* (London, 2001), p. 6.

⁵⁹ Donald Worster, ‘Doing Environmental History’, in Christine Meisen Rosen and Joel Arthur Tarr, ‘The Importance of An Urban Perspective in Environmental History’, *Journal of Urban History*, 20 (1994), p. 299. (accessed online).

⁶⁰ Christine Meisen Rosen and Joel Arthur Tarr, ‘The Importance of An Urban Perspective in Environmental History’, *Journal of Urban History*, 20 (1994), p. 307. (accessed online).

⁶¹ Jensen and Ouis, ‘Contested Construction of Nature’, p. 171.

environment on the landscape have made in an edgeland throughout the entirety of its existence.

The analysis of the management and planning of historical industrial sites also has its roots in environmental history, as well as in industrial archaeology and social and economic history. The impact of industrial growth on the landscape has been explored since the 1960s by T. C. Smout,⁶² John Butt⁶³ and B. F. Duckham⁶⁴ for Scotland in particular, and then in 1994 by Marilyn Palmer and Peter Neaverson in a more general British context.⁶⁵ These works are essential to a study of the evolution of edgelands for the ways in which they describe anthropogenic changes to the landscape. B. F. Duckham specifically notes “man’s elemental response” to various aspects of the coal industry in Clackmannanshire,⁶⁶ Ian Donnachie credits John Butt with establishing the legitimacy of looking “through contemporary eyes at the impact of industry on the Scottish scene,”⁶⁷ and Palmer and Neaverson expand on the idea of using the present to learn about the past to produce a useful methodology for analysing abandoned industrial sites. They recommend a “six-point plan...to understand the historic industrial landscape, including an analysis of the sources of raw materials, processing plants, power sources, secondary industry, accommodation and transport.”⁶⁸ Tension between the economic importance of industrial infrastructure as described by Palmer and Neaverson and its impact on the environment represented the central

⁶² T. C. Smout, ‘The Erskines of Mar and the Development of Alloa 1689-1825’, *Scottish Studies* 7 (1963), pp. 57-74; ‘Scottish Landowners and Economic Growth 1650-1850’, *Scottish Journal of Political Economy*, 11 (1964), pp. 218-234. (accessed online).

⁶³ John Butt, *The Industrial Archaeology of Scotland* (Newton Abbot, 1967).

⁶⁴ Duckham, *A History of the Scottish Coal Industry*.

⁶⁵ Marilyn Palmer and Peter Neaverson, *Industry in the Landscape 1700-1900* (London, 1994).

⁶⁶ Duckham, *A History of the Scottish Coal Industry*, pp. 149-150, pp. 210-220.

⁶⁷ Ian Donnachie, ‘A Tour of the Works: Early Scottish Industry Observed 1790-1825’ in A. J. G. Cummings and T. M. Devine (eds.), *Industry, Business and Society in Scotland Since 1700* (Edinburgh, 1994), p. 43. See also John Butt, *The Industrial Archaeology of Scotland* (Newton Abbot, 1967) and J. R. Hume and John Butt, ‘Muirkirk 1786-1802: The Creation of a Scottish Industrial Community’, *Scottish Historical Review*, 45 (1966), pp. 160-183.

⁶⁸ Palmer and Neaverson, *Industry in the Landscape*, p. 14.

dilemma in the planning and management of the Devon Colliery site across its history from Erskine to the Clackmannan District Council. The results of this dilemma have rendered the space a permanent edgeland.

Environmental quality and change has of course long been the province of both environmental science as well as history,⁶⁹ but there exist few examples in the literature of either of these two disciplines that examine the legacy of coal mine pollution and topographical change on the land.⁷⁰ A few studies from the late 1950's and early 1960's of coal tips in England including those by Hall⁷¹ and Molyneux⁷² coincided with post-war abandonment of mines and public complaints about dereliction, but these are all ecological in nature, addressing issues such as the impact of pH and physical characteristics of coal waste on plant life. Edgeland pollution is almost non-existent as a unique phenomenon and literature examining the more specific issue of soil quality is divided between urban and rural foci though weighted in the urban direction, with the rural soil quality studies for the most part agriculturally based. Rarer still are either historical or scientific explorations of Clackmannanshire,⁷³ although one important exception is Daft and Nicholson's 1974 study of

⁶⁹ See, for example B. W. Clapp, *An Environmental History of Britain Since the Industrial Revolution* (London, 1994) and I. G. Simmons, *An Environmental History of Great Britain from 10,000 Years Ago to the Present* (Edinburgh, 2001).

⁷⁰ Most current coal mine pollution studies deal with mine water. See, for example P. L. Younger, 'The Longevity of Mine Water Pollution: A Basis for Decision-Making', *Science of the Total Environment*, 194-195 (1997), pp. 457-466 (accessed online) and 'Mine Water Pollution in Scotland: Nature, Extent and Preventative Strategies', *Science of the Total Environment*, 265 (2001), pp. 309-326 (accessed online); Adam P. Jarvis and P. L. Younger, 'Broadening the Scope of Mine Water Environmental Impact Assessment: A UK Perspective', *Environmental Impact Assessment Review*, 20 (2000), pp. 85-96; Gordon A. Robb, 'Environmental Consequences of Coal Mine Closure', *Geographical Journal*, 160 (1994), pp. 33-40; S. B. Banks and D. Banks, 'Abandoned Mines Drainage: Impact Assessment and Mitigation of Discharges from Coal Mines in the UK', *Engineering Geology*, 60 (2001), pp. 31-37.

⁷¹ I. G. Hall, 'The Ecology of Disused Pit Heaps in England', *Journal of Ecology*, 45 (1957), pp. 689-720. (accessed online).

⁷² J. K. Molyneux, 'Some Ecological Aspects of Colliery Waste Heaps Around Wigan, South Lancashire', *British Ecological Society*, 51 (1963), pp. 315-321. (accessed online).

⁷³ Some exceptions include John Carvel's *One Hundred Years in Coal* (Edinburgh, 1944), William Brown's *Clackmannanshire: A Guide to Historical Sources* (Clackmannan, 1980), Richard L. Hill, 'James Watt's Surveys Around Stirling', *The Forth Naturalist and Historian*, 21 (1997), pp. 71-84 (accessed online); Ronald D. Maggregor, 'The Devon Valley: Problems of Land Use and Water Supply', *Scottish Geographical Magazine*, 68 (1952), pp. 25-34 (accessed online); and Margaret Stewart, 'John Erskine, 6th and 11th Earl of Mar (1675-1732): Architecture, Landscape and Industry', *Architectural Heritage*, 23 (2012), pp. 97-116 (accessed

plant life on the Devon Colliery bing.⁷⁴ Even more recent works from the 1990s, including Scottish Natural Heritage's huge survey of all 560 bings in Scotland⁷⁵ and Gordon Robb's examination of the environmental consequences of coal mine closure⁷⁶ do not delve into chemical analysis of heavy metal pollution in mine waste soil, or chronological analysis of sediment accumulation. Along with the more visible and archival evidence of environmental change throughout the history of the Devon Colliery site, soil quality as measured by heavy metal accumulation and topographical change as measured by sediment accumulation will reveal the chemical and physical characteristics that have allowed the Devon Colliery site to remain classified as an edgeland.

The interaction between environmental regulation and public response has been dealt with in some of the latest works of environmental history, including those by T. C. Smout and Marie Stewart, Harold Platt and Stephen Mosley. In their 2012 book, Smout and Stewart establish a timeline of the evolution of local and national decisions and responses to pollution problems in the Firth of Forth that naturally leads to questions about whether coal mining on the River Devon resulted in similar processes.⁷⁷ Platt also explores these themes for Victorian and Edwardian Manchester and Chicago in *Shock Cities*, introducing the notion of the "paradox of progress", or the idea that the residents of urban industrial areas "produced a cornucopia of material wealth but at the cost of destroying the quality of life within which to enjoy it."⁷⁸ In *The Chimney of the World*, also about environmental change in Victorian Manchester, Mosley expands on Platt's paradox by addressing the discrepancies between industrial and economic prosperity, public indignation toward smoke pollution in Victorian

online). There are also several popular pictorial studies of Clackmannanshire, including Guthrie Hutton, *Mining From Kirkintilloch to Clackmannan and Stirling to Slamannan* (Ochiltree, 2000) which is used in this study.

⁷⁴ M. J. Daft and T. H. Nicholson, 'Arbuscular Mycorrhizas in Plants Colonizing Coal Wastes in Scotland', *New Phytologist*, 73 (1974), pp. 1129-1138. (accessed online).

⁷⁵ R. L. Allan, et al, 'The Natural Heritage Interest of Bings (waste tips) in Scotland: Inventory and Review', (1997), Scottish Natural Heritage, snh.org.uk/pdfs/publications/review/048.pdf. [accessed 22 January 2014].

⁷⁶ Robb, 'Environmental Consequences of Coal Mine Closure'.

⁷⁷ Smout and Stewart, *The Firth of Forth: An Environmental History*.

⁷⁸ Platt, *Shock Cities*, p. xiv, p. 12.

Manchester, and regulatory response.⁷⁹ While these works are crucial for establishing the relationships between the earliest urban environmental regulations and the responses to these policies, they leave open the necessity of examining these issues for edgeland sites such as the coalfields of Clackmannanshire which were providing the energy and powering the prosperity and subsequent pollution of these urban centres. In terms of the Devon Colliery site, then, the hypothesis is that the regulatory record for coal mining and waste and the public responses to it will reveal a certain ambivalence toward the management of the impact of coal on the environment that is simultaneously created by and helps to perpetuate mining's edgeland status.

Methodology

This study uses methodologies and sources from history and science to look both forwards and backwards at the story of the former Devon Colliery and the impact of coal mining on the site's soil and topography during its active life. The story continues into abandonment, mitigation, reclamation and potential sustainability and resilience. The site's environmental history is then used to establish factors that determine edgeland status, to analyse its evolution as an edgeland, and to describe its legacy. Documents written by the principal players in the creation of the colliery landscape, John Francis Erskine and Robert Bald,⁸⁰ along with records of the Alloa Coal Company,⁸¹ the National Coal Board,⁸² the

⁷⁹ Mosley, *The Chimney of the World*.

⁸⁰ Robert Bald, 'Additional Observations on the Coalfield of Clackmannanshire and a description of the absolute shape or form of the coalfields in Great Britain,' in *Memoranda of the Wernarian Natural History Society, Volume 3: 1817-1820*, pp. 123-125; *On the Coal Formation of Clackmannanshire* (Edinburgh, 1819); *A General View of the Coal Trade of Scotland, Chiefly that of the River Forth and Mid Lothian* (Edinburgh, 1808); John Francis Erskine, *General View of the Agriculture of the County of Clackmannan and some of the adjacent parishes, situated in the counties of Perth and Stirling* (Edinburgh, 1795).

⁸¹ National Archives of Scotland, Papers in legal dispute, Alloa Coal Company and Earl of Mar versus Bald's Trustees, CB24/111, 1842-1854; Administrative papers, mainly reports, relating to the state of the coalfields, CB24/143, 1863-1872; Miscellaneous legal and administrative papers and correspondence relating to Devon Colliery and Alva Estate, CB24/150, 1746-1946; Miscellaneous legal and administrative papers, CB24/161, 1835-1922.

Central Regional Council⁸³ and the Clackmannan District Council⁸⁴ will be used to demonstrate how the relationship between the natural location of the Devon Colliery and the subsequent built environment created on the landscape resulted in the creation of the edgelands that has existed for more than two hundred years. Applying Palmer and Neaverson's six factors for understanding an industrial landscape to descriptions of the Devon Colliery site garnered from the aforementioned records will help highlight the fact that the management and planning of the Devon Colliery was not a straightforward question of sacrificing the environment for the economy and that the results of the dilemmas created by this issue throughout the active life and subsequent abandonment and mitigation of the mine site have rendered the space a permanent edgeland.

The issue of environmental quality and change will be addressed both archivally as well as using soil samples as a record. Impact on the environment of the colliery and its nearby surroundings in the form of fire, water, and farmland damage are well-documented from as early as 1830.⁸⁵ Records from the Department of Agriculture and Fisheries,⁸⁶ the Scottish Development Department,⁸⁷ mining engineer reports⁸⁸ and papers from Scotland Salmon Fishing⁸⁹ and the Devon Angling Association⁹⁰ all give evidence of the environmental impact of coal mining on the River Devon from 1893 to the present. The legacy of the Devon Colliery site from abandonment in 1960 to the present can be analysed

⁸² National Archives of Scotland, Secretariat Department: Minutes of Planning Committee meetings at Devon Colliery, CB276/1/1, 1949-1960; Secretariat Department: Closure of Devon Colliery, CB276/14/1, 1960; Secretariat Department: Devon Colliery, CB276/24/1, 1962.

⁸³ Stirling Council Archives, Central Regional Council, Minutes of planning and development and land and building committee meetings, CR1/1/4-CR1/1/35, 1976-1992; Reports to planning and development committee, 1976-1979.

⁸⁴ Clackmannanshire Council, planning reports relating to the Devon Equestrian Centre, 2006-2010, <http://www.clacksweb.org.uk/council/reports/?title=equestrian+centre&author=&bodyid=&catid=&from=&fromy=&tom=&toy=&so=category&sub=1>. [Accessed 10 April 2014].

⁸⁵ 'Burning Coal Mine at New Sauchie', *The American Journal of Science and Arts*, 18 (1830), p. 386. (accessed online).

⁸⁶ National Archives of Scotland, Land Drainage (Scotland) Act 1941: River Devon Drainage Scheme, AF44/282, 1942-1943; River Devon, AF62/2360, 1926-1964.

⁸⁷ National Archives of Scotland, River Purification, DD13/2662, 1893-1959.

⁸⁸ National Archives of Scotland, Miscellaneous legal and administrative papers, CB24/161, 1835-1922.

⁸⁹ National Archives of Scotland, Salmon Fishings, CR10/686, 1897-1913.

⁹⁰ Devon Angling Association Archives, Minutes of Meetings, 1926-2006.

using the present-day condition of the site's soil and sediments for they may reveal information about how natural (chemical and physical) and cultural factors have interacted to create an edgelands legacy at the former Devon Colliery. Archival material will indicate the policies and proceedings relevant to the reclamation of abandoned coal mines, but only soil quality as assessed by its chemical and physical properties will indicate whether these policies actually had any bearing on the land. This study will seek to test the hypothesis that, due to mitigation efforts, chemical indicators will reveal no significant levels of heavy metals impacting the soil's function. However, physical indicators will probably reveal greater functional impact given that there is archival evidence for morphological changes as mining extended under the river,⁹¹ along with the fact that mitigation itself resulted in topographical change at the site. Concentration of expected heavy metal pollutants will be measured using x-ray fluorescence and compared against published key values for threshold pollutants for mining sites, and IRSL-OSL core profiles will be used to analyse the accumulation of sediments layers on the bing.

Regulation and public response will be examined through policy and legislation in three categories, coal, water supply and pollution, and local authority and jurisdiction,⁹² its impact on environmental quality at the Devon Colliery and public response to this impact. The record of these policies and legislation along with evidence of public response in the form of local action⁹³ will help to prove that the ambivalence toward the regulation of coal mining in the first half of the nineteenth century through the attempt to regulate industrial river pollution in the second half of that century and onwards to the first environmental

⁹¹ National Archives of Scotland, Administrative papers, mainly reports, relating to the state of the coalfields, CB24/143, 1863-1871; Miscellaneous legal and administrative papers, CB24/161, 1835-1922.

⁹² See, for example, coal legislation including c.99, Mines and Collieries Act of 1842, 5&6 Vict. Water supply and pollution issues as well as jurisdiction over these matters were addressed through legislation including c. 224, An Act to Confirm the Provisional Order Under the Public Health (Scotland) Act 1867; c. 55, Rivers (Pollution Prevention) Act 1876 39&40 Vict. and c. 65, local Government (Scotland) Act 1973.

⁹³ Devon Angling Association Archives, Minutes of Meetings, 1926-2006.

regulation of coal mine waste in the 1969⁹⁴ helped to create and perpetuate mining's edgeland status.

There are many other angles from which the notion of an edgeland could be examined, although these lie beyond the scope of this particular study. The “phenomenological” approach from sociology⁹⁵ could be used to try to understand the meaning and significance of edgelands in the present day. The role of class in the perception of edgelands both in their creation as well as their legacy is also important in the larger picture, though less so for a study that is more about the story told by the environment itself than about what people have to say about their environment. Culture and identity are of course part and parcel of class analysis, though again, how edgelands shape a community's identity is not a focus of this study. In general, use of more traditional social science methodologies would place the onus of environmental change solely on humans, asking questions including those concerning sociological origins and policy consequences of attitudes toward edgelands rather than giving nature its due as an historical agent in the creation of the peculiar landscape.

Ultimately, this study results in an understanding of how culture has impacted the “...functional, historical and evolutionary limits” of nature⁹⁶ at the Devon Colliery site, thereby creating its legacy. The findings produced by this study will demonstrate the complexity of edgeland legacies and the challenge of this legacy for their management. Swetnam recommends identifying the “limits of nature” in order to establish sustainable goals for management,⁹⁷ but as Shoard points out, there is a particular irony inherent in the concept of edgelands management: if edgelands are managed more directly, they may cease

⁹⁴ c. 10, Mines and Quarries (Tips) Act 1969.

⁹⁵ See, for example Christopher Tilley, *A Phenomenology of Landscape: Places, Paths and Monuments* (Oxford, 1994).

⁹⁶ T. W. Swetnam, C. D. Allen, & J. L. Betancourt, ‘Applied Historical Ecology: Using the Past to Manage for the Future’, *Ecological Applications*, 9 (1999), p. 1202.

⁹⁷ Swetnam et al, ‘Applied Historical Ecology’, pp. 1189-1190.

to be edgelands.⁹⁸ Documenting the chemical and physical qualities of an edgeland in addition to describing its evolution in order to “...chronicle and assert its value”⁹⁹ will, in the long run, create management strategies which can help preserve the legacy of this peculiar landscape.

⁹⁸ Shoard, ‘Edgelands’, p. 139.

⁹⁹ *Ibid*, p. 140.

Chapter I

The Lay of the Land

Although Marion Shoard acknowledges that edgelands show "...history as in the stratified layers on an archaeological site,"¹ she does little to address these layers and their origins. Edgeland origins are best defined by first examining the natural, physical location of a site such as the Devon Colliery and Iron Works, then by exploring the tensions created between the mining and agricultural landscapes of the area. Between 1792 and 1835, the Devon Colliery and Iron Works site could not be considered an industrial site, yet certainly mining and smelting developments during this period meant that the site was no longer contiguous with the surrounding agricultural landscape by 1835. The origins of the Devon Colliery and Iron Works as an edgeland lie in the liminal qualities of the landscape, located physically as well as conceptually between industrial development and agriculture. The "layers" of this edgeland then follow. By 1880, the struggle to resolve the tension between nature and culture by the Alloa Coal Company resulted in a completely industrialized site, albeit one still set apart from its surroundings by natural boundaries. Such isolation meant that the increasingly negative landscape changes resulting from full industrialization were, for the most part, ignored by the general public through the first half of the twentieth century, thus perpetuating the site's edgeland status. Still easier to ignore was the abandonment of the space by the National Coal Board (NCB) in 1960 when the site, derelict, isolated, and without economic value entered the realm of the classic edgeland. Even with its mitigation beginning in the 1970s, the current poor physical qualities of the Devon Colliery site's soils limit its functionality and purpose and continue to set it apart as an edgeland in the present day.

¹ Marion Shoard 'Edgelands', in Jennifer Jenkins (ed.), *Remaking the Landscape: The Changing Face of Britain* (London, 2002), p. 123.

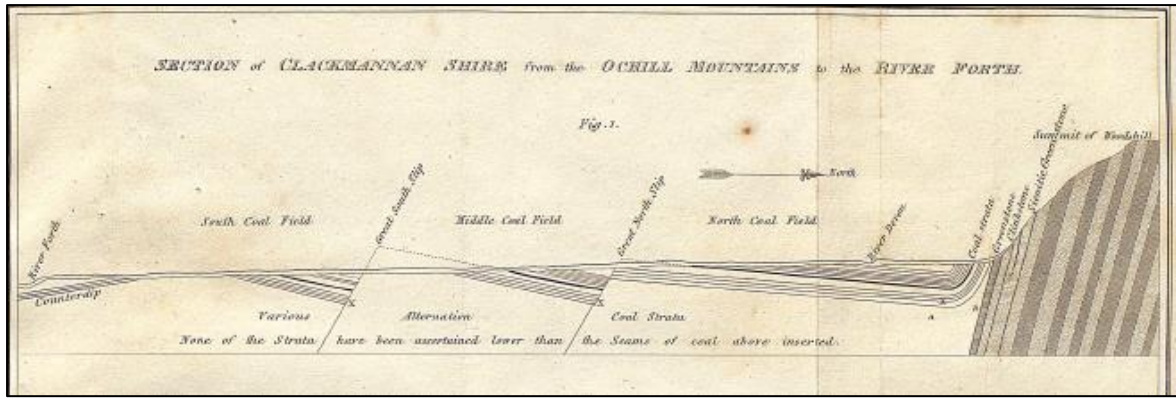


Fig. 2 Robert Bald's diagram of the coal fields of Clackmannanshire²

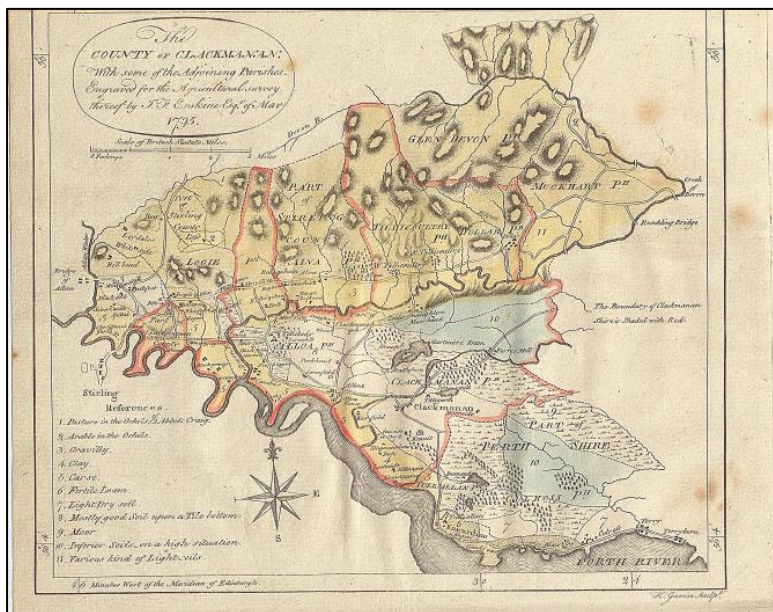


Fig. 3: John Francis Erskine's soils map of Clackmannanshire³

² Robert Bald, 'Additional Observations on the Coalfield of Clackmannanshire and a description of the absolute shape or form of the coalfields in Great Britain,' in *Memoranda of the Wernerian Natural History Society, Volume 3: 1817-1820*, plate IV.

³ John Francis Erskine, *General View of the Agriculture of the County of Clackmannan and some of the adjacent parishes, situated in the counties of Perth and Stirling* (Edinburgh, 1795).



Fig. 4: Modern geological map of the site⁴

The site of the former Devon Colliery and Iron Works sits on the banks of the River Devon, almost exactly half-way along a six mile transect between the Ochils to the north and the River Forth to the south. This “space between” was defined naturally by geography and geology long before the establishment of the Devon Iron Works in 1792; bordered to the north by the River Devon and on the south by the Great North slip fault line, the site was a part of the extensive North Coal Field (see fig. 2) which served as the main coalfield of Clackmannanshire⁵ for more than three hundred years from the seventeenth to twentieth centuries.⁶ John Francis Erksine’s 1795 map of the County of Clackmannanshire (see fig. 3) depicted his coal pits as located between “mostly good soil upon a Tile location” and “gravilly” land.⁷ His future mine manager, Robert Bald corroborated this observation in 1819, reporting that a “great bank of earth and stones from the mountain face continues south until it joins the alluvial soil formed by the Devon, extending very near the Devon

⁴ ‘Fishcross’, Ordnance Survey/Edina supplied service (2014), <http://digimap.edina.ac.uk/roam/os>. [Accessed 25 July 2014].

⁵Bald, ‘Additional Observations on the Coalfield of Clackmannanshire’, p. 3 and plate IV, figure 1.

⁶ Alloa, County of Clackmannan Account of 1834-1935, *The New Statistical Account*, vol 8, p. 25. (accessed online)

⁷ Erskine, *General View of the Agriculture of the County of Clackmannan*.

Iron Works. From here to the Forth, red clay, called till, is mixed with sand and is impervious to water.”⁸ The *Old Statistical Account (OSA)* also bore out the idea that the colliery and iron works were situated in a geological space between. It noted:

Those (soils) on the banks of the Devon are a good carfe or clay, though not quite fo fertile. The grounds rife pretty fuddenly from the carfes, and are of a light kind, but fertile. Towards the centre of the parish, the grounds are pretty high. They are most agreeable diverfified; but the land is much inferior in quality...⁹

It continued: “The haughs, near the Dovan, prefont a deep loam mixed with fand, and the foil is very different from that of the crofts. The lands fouth of the Dovan are much inferior to thofe on the north fide.”¹⁰ These early observations are confirmed by modern geological surveys of the area (see fig. 4), according to which the line between alluvium to the north and till to the south runs right through the site of the former mine and iron works.¹¹ The situation of the colliery and iron works in this space so clearly set apart from the rest of the county by the River Devon and delineated by varying soil types figures significantly in the designation of the space as a natural edgeland.

Superimposed on this natural landscape were the landscapes of both agriculture and industry. Erskine described the “pleasant vale of the Dovan,” which was “very fertile and bears excellent grain”¹² in practically the same breath as he described the neighbouring Devon Iron Works with its “two furnaces, each upwards of 40 feet high by 14 feet in diameter.”¹³ The *OSA* went into greater detail:

The fituation and fingular construction of the Devon iron works, begun in July 1792, merit the attention of the curious in mechanicks and architecture. A fteep bank rifes more than 50 feet above the level of the river, and is compofed of a mock, or very

⁸ Bald, ‘Additional Observations on the Coalfield of Clackmannanshire,’ pp. 4-5.

⁹ Alloa, County of Clackmannan Account of 1791-1799, *The Old Statistical Account*, vol. 8, p. 594. (accessed online).

¹⁰ Tillicoultry, County of Clackmannan, Account of 1791-1799, *The Old Statistical Account*, vol. 15, p. 192. (accessed online)

¹¹ ‘Fischcross Geology Map’, <http://digimap.edina.ac.uk/geologyroam/geology>. [Accessed 11 March 2014].

¹² Erskine, *General View of the Agriculture of the County of Clackmannan*, pp. 13-14.

¹³ *Ibid*, p. 65.

thick fratum of free-ftone....Inftead of the ufual method of building with ftone and lime, the feveral parts of the works have been formed in this bank, by excavations made in the rock....In like manner, is formed the engine houfe, and its apparatus, which is intended to fupply the two furnaces with wind.¹⁴

Iron making in the midst of Erskine’s “pleasant vale,” then, was part and parcel of the “natural” landscape, with the land itself providing not only the raw materials, but also the facilities for processing these materials. The same held true for mining at Erskine’s Devon Colliery, which along with the Clackmannan, Sauchie and Kennet coalfields produced the coal powering the Iron Works’ blast furnaces.¹⁵ As part of the Sauchie coalfield, Devon Colliery would have had access to four coal seams, including the three feet, the upper and lower five feet seams, and the nine feet seam. At the turn of the eighteenth century, the engine pit was 282 feet deep, and as “[T]he depth of a bearing pit cannot well exceed 18 fathoms, or 108 feet,” colliers could not reach the nine foot seam, which was 96 feet below the engine pit.¹⁶ Even the *OSA* made disparaging remarks concerning the under-utilization of the site’s coal resources, noting that

[T]he Devon company have been tackfmen of the coal for more than a year and a half, but have wrought non, except a very fmall quantity for land fale. The defign of taking a coal, without working it, is *incomprehensible*. While coals remain underground, they are of no value, either to the proprietor or the tackfmen.¹⁷

The *OSA* had similar reservations about the ability of the iron works to fully develop. It “acknowledged...that the eftablishment of the Devon Company, in the immediate neighbourhood, will, perhaps, overbalance all thefe apparent disadvantages, though the writer of this account is by no means fanguine in his expectation of that effect.”¹⁸ Despite the activities at both the iron works

¹⁴ Clackmannan, County of Clackmannan Account of 1791-1799, *The Old Statistical Account*, vol. 14, p. 626. (accessed online).

¹⁵ Alloa, County of Clackmannan Account of 1791-1799, *The Old Statistical Account*, vol. 8, pp. 621-622. (accessed online)

¹⁶ Clackmannan, County of Clackmannan Account of 1791-1799, *The Old Statistical Account*, vol. 14, p. 626. (accessed online).

¹⁷ Tillicoultry, County of Clackmannan, Account of 1791-1799, *The Old Statistical Account*, vol. 15, p. 198. (accessed online).

¹⁸ *Ibid*, p. 215.

as well as the colliery, then, the site was not fully exploited for industrial purposes at the turn of the eighteenth century.

This, however, did not mean that tension did not exist between the landscape of the colliery and iron works and the adjacent agricultural land. By 1819, thanks to the ingenuity of Erskine's mine managers, Alexander and Robert Bald,¹⁹ the pit at Devon Colliery had extended to 704 feet, thereby easily accessing the nine feet seam.²⁰ Such decisions by the Balds to alter the natural landscape by sinking coal pits hundreds of feet below the surface began to define a landscape which, once these pits were excavated, could not be used for agricultural purposes. Although not yet an "industrial" site, its physical qualities including the locations of the coal seams, the River Devon and the use of the sandstone banks themselves for blast furnaces set the site apart on an island from both its more urban as well as agricultural neighbours, establishing its origins as an edgeland.



Fig. 6: Map showing Sauchie Village and Coalsnaughton²¹

Although miners and iron workers obviously did not live literally at the pit heads or furnaces, the notion of the site as an edgeland can be expanded to include miners' accommodation at Fishcross, or Sauchie Village as it was also known, the mining community closest to the colliery and the works. Adequate accommodation for his miners was as much a concern for Robert Bald as

¹⁹ John Lees Carvel, *One Hundred Years in Coal, the History of the Alloa Coal Company* (Edinburgh, 1944), pp. 14-16.

²⁰ Bald, 'Additional Observations on the Coalfield of Clackmannanshire', p. 18.

²¹ James Stobie, 'The Counties of Perth and Clackmannan', (Perth, 1805), <http://maps.nls.uk/joins/664/html>. [Accessed 11 March 2014].

was the actual mining of coal itself; he was responsible not only for erecting many miner's cottages at Coalsnaughton,²² slightly further away from the Devon Colliery than Fishcross (see fig. 5), but also for insisting that ash pits be removed from the fronts of buildings and for implementing rules about street sweeping and maintaining clean houses and grounds.²³ The notion of miners' communities being separate from towns is not new; David Bremner described the public's perception of the early nineteenth century collier as "almost unconscious of his existence," and observed that "often the circle of his [the collier's] intimate acquaintance does not extend beyond the little community attached to the pit in which he works."²⁴ According to Bremner, worker accommodation was intimately associated with even if not physically connected with the work place, thus making possible the extension of edgeland status to include villages like Fishcross and Coalsnaughton. Not only that, the isolated location of these villages makes it possible for the rest of society to forget about their existence, a characteristic which is for Shoard a hallmark of edgelands.

Analyzing the initial formation of an edgeland such as the site of the Devon Colliery and Iron Works as opposed to examining the characteristics of one that has already been established requires expansion of Shoard's conception of landscape transformation. In order for an edgeland to exist, a "human hand" by necessity must first chose that space "to mould," even though according to Shoard, an edgeland results from space that has not been moulded by human hand.²⁵ The intimate relationship between the opportunities which the land had to offer and how the Erskines, Balds, and the founders of Devon Iron Works chose "mould" these natural, physical characteristics helped to establish this unique corner of Clackmannanshire as an edgeland located between town

²² Eric J. Evans, *Tillicoultry A Centenary History: 1871-1971* (Tillicoultry, 1972), p. 9; Carvel, *One Hundred Years in Coal*, p. 18.

²³ Carvel, *One Hundred Years in Coal*, p. 18.

²⁴ David Bremner, *The Industries of Scotland: Their Rise, Progress, and Present Condition* (Edinburgh, 1869), p. 19.

²⁵ Marion Shoard, 'A Call to Arms' (2013), <http://www.urbanwildscapes.org/wp-content/uploads/2011/09/UW-Marion-Shoard-A-Call-to-Arms.pdf>, p. 82. [Accessed 15 May 2014].

and hillside. Both the iron works itself as well as the coal it utilized were products of the natural landscape in which they were located, thus connecting the built environment to nature and disproving the notion that anthropogenically created environments are “wholly expressive of culture.”²⁶

Even as coal mining became more industrialized and eventually replaced the Devon Iron Works as the primary industry on the site, the River Devon continued to provide a natural backdrop for the mining and smelting landscapes. As described by the *New Statistical Account (NSA)* it was still “celebrated by tourists and poets...the most remarkable stream in the parish,” yet even it experienced anthropogenic alterations as the flooding of the river which had plagued farmers from earlier times was “now, in some measure, prevented by embankments raised in places most exposed to inundation.”²⁷ In fact, the river continued to dominate contemporary narrative accounts of Clackmannanshire. James Lothian wrote: “[T]he whole district of the Devon has always been a favourite resort of...tourists...It is, indeed, a most beautiful, attractive, and salubrious locality”²⁸ on the same page as he gave the background of the Devon Iron Works²⁹ yet nowhere does he make any mention of the colliery, in any sort of terms, positive or negative. Under the management of the Erskines and Balds, tension between the natural and the cultural landscape had created the origins of this edgeland, but between 1835 and 1880, the newly-formed Alloa Coal Company attempted to break that tension by dominating the natural. This resulted in the elusive quality of the contemporary descriptions and a sense of dislocation that earned the space the continued designation as an edgeland. The “struggle between human ingenuity and the fickle reluctance of

²⁶ Donald Worster, ‘Doing Environmental History’, in Christine Meisen Rosen, Christine and Joel Arthur Tarr, ‘The Importance of an Urban Perspective in Environmental History’, *Journal of Urban History*, 20 (1994), p. 299.

²⁷ Tillicoultry, County of Clackmannan Account of 1834-1845, *The New Statistical Account*, vol. 8, pp. 67-68. (accessed online).

²⁸ James Lothian, *Alloa and Its Environs: A Descriptive and Historical Sketch* (Alloa, 1861), p. 72.

²⁹ *Ibid.*

nature”³⁰ shaped both the cultural and natural landscape of the site and helped to maintain the location as an edgeland from the founding of Alloa Coal in 1835,³¹ through the shutdown of the Devon Colliery in 1854,³² the closing of the ironworks in 1858,³³ and the reopening of the Devon Colliery in 1880.³⁴

Until its closing in 1858, Devon Iron Works consumed forty per cent of the Clackmannanshire’s coal; 200 of the 500 tons average produced by the Devon, Clackmannan, Kennet and Gurtary collieries went to smelting iron, while “the rest is shipped to various parts of Scotland” and “[A] considerable quantity is also shipped to the continent yearly.”³⁵ In addition to the coal, the Iron Works also worked three bands of ironstone contained in the nine-foot seam.³⁶ The Iron Works itself produced ten to twelve thousand tons of iron per year³⁷ and at the time of its closure, consisted of three blast furnaces with blowing engines, a foundry with moulding shops, as well as turning and boring shops. The finished product was shipped out via a private rail line 300 yards from the works connected both to Clackmannan Coal Company’s line as well as Stirling railroad.³⁸ Unfortunately, however, the *OSA* was correct in its predictions of success for the Devon Iron Works. Use of the private tracks for transporting in the lime needed for smelting as well as for shipping out the finished iron proved costly, prompting the original partners to propose a canal from the Forth at Cambus to the Iron Works which never materialized.³⁹ In 1838, Devon Iron

³⁰ Lewis Mumford quoted in Gavin Bridge, ‘Contested Terrain: Mining and the Environment’, *Annual Review of Environment and Resources*, (29) 2004, p. 241n.

³¹ Carvel, *One Hundred Years in Coal*, p. 2.

³² National Archives of Scotland, David Landale, Report on the Sauchie and Alloa Collieries, CB24/143, 31 July 1865.

³³ ‘Adjourned Sale of the Devon Iron Works in Clackmannanshire’, *Alloa Advertiser*, 13 November 1858.

³⁴ ‘Operations at Devon’, *Alloa Advertiser*, 1 May 1880.

³⁵ Clackmannan, County of Clackmannan Account of 1834-1845, *The New Statistical Account*, vol. 8, pp. 123-124. (accessed online).

³⁶ Clackmannan, County of Clackmannan Account of 1834-1845, *The New Statistical Account*, vol. 8, pp. 124-125. (accessed online).

³⁷ Lothian, *Alloa and its Environs*, p. 72.

³⁸ ‘Adjourned Sale of the Devon Iron Works’.

³⁹ Carvel, *One Hundred Years in Coal*, p. 49.

Works sublet rights to the coal at its doorstep to Alloa Coal,⁴⁰ following this transaction the works were sold to Mr. Miller in 1858 and were subsequently closed.⁴¹

On the other hand, the fortunes of Alloa Coal seemed to be on the rise from the start. Once Robert Bald resigned from his post in 1835 and John Francis Miller Erskine relinquished control of the site to Alloa Coal,⁴² coal, its extraction and its processing became the most significant defining characteristic of the landscape. The lease for the coal granted by Devon Iron Works in 1838 explicitly stipulated acceptable landscape changes to “the whole seams of coal in that part of...Sauchie situated on the North side of the road leading from Stirling, by the north end of the Tullibody wood and Coalsnaughton to Tillicoultry bridge.”⁴³ William Mitchell of Alloa Coal agreed “to erect two steam engines and engine houses, the one for pumping water and draining and the other for winding the coal in the aforesaid (five feet) seam....The tack also includes the whole machinery, engine houses, shops and warehouses erected or to be erected by the tenants.”⁴⁴ Further changes in the cultural landscape came in 1851 when, according to mining engineer David Landale, “[A] large fitting was begun...at the Furnace Bank pit, [Devon Colliery]⁴⁵ which would have won at least 1,680,000 tons of coal or 60,000 tons a year for 28 years.⁴⁶ The pit was sunk about 90 fathoms and has only ten more to go to the lower five foot seam.”⁴⁷ The fitting of the Furnace Bank pit was deferred in 1854 as a result of excess water rising from “certain ill advised mines” in neighbouring Glenfoot,⁴⁸ in addition to “dull trade” with the Iron Works.⁴⁹ Nevertheless, the age of steam power and the subsequent ability to significantly expand

⁴⁰ National Archives of Scotland, Subtack, Devon Iron Works to Alloa Coal CB24/150, 1838.

⁴¹ ‘Devon Iron Works’, *Alloa Advertiser*, 29 March 1856; ‘Adjourned Sale of the Devon Iron Works’.

⁴² Carvel, *One Hundred Years in Coal*, pp. 23-24.

⁴³ National Archives of Scotland, Subtack, Devon Iron Works to Alloa Coal CB24/150, 1838.

⁴⁴ *Ibid.*

⁴⁵ Carvel, *One Hundred Years in Coal*, p. 50.

⁴⁶ National Archives of Scotland, David Landale, Report on the Sauchie and Alloa Collieries, CB24/143, 31 July 1865, p. 2.

⁴⁷ *Ibid.*

⁴⁸ *Ibid.*, p. 3.

⁴⁹ Carvel, *One Hundred Years in Coal*, p. 50.

mining processes had arrived on the banks of the Devon, thereby dominating the natural landscape. The seams of coal the Erskines were able to take advantage of because of the Balds' knowledge of the site's natural characteristics were now part of a culturally created space. With the mine no longer part of an agricultural estate, there was no longer the possibility that agricultural concerns might override coal decisions and the space as defined by the coalfield was free to become wholly industrial. Yet the site could not ever physically escape its natural boundaries of the river and the hills beyond and it was the uneasy coexistence between the two that lent it its edgeland qualities.

Once free of its relationship with the Devon Iron Works, Alloa Coal was empowered to take advantage of the transportation sector's newly insatiable need for coal.⁵⁰ Some of the most significant landscape changes in the 200 year life of the site help to highlight this historic shift, beginning with the decision in 1873 by Alexander Roxburgh, then manager of Alloa Coal, to reopen Devon Colliery.⁵¹ This monumental task took nearly ten years and cost more than the £10,000 originally budgeted for it.⁵² The *Alloa Advertiser* described the project a year before the Colliery reopened, reporting a 600 foot shaft, a new engine "enclosed in a neat and commodious building" and "two large, handsome and powerful boilers." A pair of 24 inch winding engines with "mahogany, iron, and steel cylinders" along with "a 12 foot revolving drum for winding wire ropes" and 12 foot pulleys completed the industrial infrastructure.⁵³ Even accommodation was accounted for; masons made "improvements and alterations" to the workmen's houses at Fishcross, previously owned by the Iron Works.⁵⁴ Once the work was completed, the *Advertiser* again marvelled at the transformed landscape. The "neat and commodious building" which was the beam engine

⁵⁰ *Ibid*, p. 50.

⁵¹ *Ibid*, p. 82.

⁵² *Ibid*.

⁵³ 'Operations at Devon'.

⁵⁴ *Ibid*.

house and had never pumped was now lifting five tons of water per minute or eight million gallons of water in 24 hours.⁵⁵ A fan 30 feet in diameter moved air in the shafts 200,000 cubic feet per minute, necessary ventilation in a mine system extending over an area of three square miles from which two tons of coal per minute could be raised.⁵⁶ A branch railroad now ran from the colliery site to Alloa Harbour, and finally, the “improvements and alterations” to the workmen’s quarters resulted in “substantial and commodious tenements.”⁵⁷

With the closing of the Devon Iron Works and with the sole focus of the site now on the industrial production of coal, cultural attempts to exploit the landscape both above and below ground became unapologetic and the site had become wholly industrial by 1880. Previous attempts to “mould” the landscape had resulted in fixtures such as the iron works’ blast furnaces which were a part of the natural world. The latest transformations of this period proclaimed the superiority of man over nature: the pumping experience that “...was one of the most gigantic ever undertaken”⁵⁸ mastered the water problems that had plagued the mine for more than one hundred years, the fires that had plagued the nearby Collyland pit were extinguished⁵⁹ and could no longer threaten Devon Colliery, and plans were afoot to extend the mine under the river.⁶⁰ In 1838, a 35 foot water wheel was considered “giant,”⁶¹ and in his *Reminiscences of Tillicoultry*, William Gibson mentions another from that time that was ordered to be taken down on account of its size.⁶² A mere forty five years later, however, Devon Colliery’s massive new industrial infrastructure was celebrated as the

⁵⁵ ‘Extensive Mining Operations at Devon’, *Alloa Advertiser*, 9 September 1882.

⁵⁶ *Ibid.*

⁵⁷ *Ibid.*

⁵⁸ *Ibid.*

⁵⁹ ‘Burning Coal Mine at New Sauchie’, *The American Journal of Science and Arts*, 18 (1830), p. 386. (accessed online).

⁶⁰ National Archives of Scotland, David Landale, Report on the Sauchie and Alloa Collieries, CB24/143, 31 July 1865.

⁶¹ William Gibson, *Reminiscences of Dollar, Tillicoultry, and other districts adjoining the Ochils* (Edinburgh, 1882), p. 146.

⁶² *Ibid.*, p. 55.

“height of progress” for the time.⁶³ Yet mining remained a liminal activity that took place in a liminal space; clearly from contemporary accounts of the location, the colliery was a “mysterious no man’s land”⁶⁴ whose underground dooks and crosscuts passed “unnoticed.”⁶⁵ The above ground structures they necessitated must have created a profound sense of dislocation for Clackmannanshire Victorians resulting in the continued designation of the space as edgeland into the latter half of the nineteenth century.

Narrative descriptions of Clackmannanshire from the 1880s continued to express a certain ambivalence or tension between the natural and cultural landscape of the county that contrasted strikingly with the celebrations of industry depicted in both the old and new versions of the *Statistical Accounts*. David Beveridge, who grew up in the county, described it as “a region which, though neither inaccessible nor remote, was still comparatively unknown, and unvisited by, the majority of Scottish tourists.”⁶⁶ He continued:

Here, too, [the Devon valley] strikes a visitor as being divested of the prosaic and monotonous surroundings which are often the characteristics of factory life in our great towns; and certainly the picturesque and romantic nature of the surroundings—where rocky glens and cascades abut on the factories, and beautiful mountain scenery is within five mines walk of the whirl of the spindles...⁶⁷

Clackmannanshire, for Beveridge, was an edgeland location. In his own words, it was not remote, as true “wild” land would be. Despite its accessibility, it is not frequented by tourists, even though its primarily rural industry could have been ignored in favour of its beautiful scenery. The same sort of awareness of the peculiarity of the region was

⁶³ Carvel, *One Hundred Years in Coal*, p. 83.

⁶⁴ Shoard ‘Edgelands’, p. 117.

⁶⁵ *Ibid.*

⁶⁶ David Beveridge, *Between the Ochils and the Forth: A description, topographical and historical of the country between Stirling Bridge and Aberdour* (Edinburgh, 1888), pp. v-vi.

⁶⁷ *Ibid.*, p. 250.

demonstrated by William Gibson, also a Clackmannan native, who wrote: “to any one who wishes to see the lovely valley of the Devon in all its beauty, let them take a bird’s-eye view of it, as I did this summer, and they will be amply rewarded for their trouble.”⁶⁸ While Gibson dedicated significant passages to descriptions of various manufacturing firms in the hillfoots villages,⁶⁹ he did not write a single word about coal mining or even its consumption by the county’s industries. Gibson’s “birds-eye view” apparently did not afford him the sight of the Devon Colliery and its brand new, sprawling industrial apparatus. As a “repository for functions” Victorians preferred “not to think about,”⁷⁰ the colliery continued to serve as an edgeland space into the twentieth century, especially as further expansion and mechanization began to have measurable impact on the environment at this time.

Presumably, the re-opening of Devon Colliery in 1880 can be largely credited with the five-time increase in Alloa Coal’s output between 1870 and 1899.⁷¹ The managers of the Colliery, Alexander Roxburgh followed by James Bain in 1899, had mastered not only its above ground expansion. They, along with the mining engineers they employed between 1883 and 1909 were confident in their ability to master the below-ground environment by extending their mines beneath the River Devon and on under Mr Johnstone’s land in Alva on the north side of the river for a total area of 258 extraction acres by 1909.⁷² David Landale’s initial 1883 report on the “proper size of pillars and barriers necessary for keeping up the River Devon”⁷³ sounded a cautious note on the attempt to mine under the river. He warned: “this is a very ticklish seam and apt to creep by the pillars sinking in the pavement

⁶⁸ Gibson, *Reminiscences*, p. 57.

⁶⁹ *Ibid*, pp. 143-154; pp. 162-169.

⁷⁰ Shoard, ‘Edgelands’, p. 119.

⁷¹ Evans, *Tillicoultry: A Centenary History*, p. 34.

⁷² National Archives of Scotland, Alloa Coal Company memo: Devon Colliery Total Extraction Area. Alva Estate, CB24/150, 2 September 1909.

⁷³ National Archives of Scotland, David Landale, Opinion as to the proper size of pillars and barriers necessary for keeping up the River Devon and the lowlying land adjoining the Alva and Alloa coalfields, CB24/161, 16 January 1883.

particularly if water is ever allowed to accumulate and afterwards be withdrawn.”⁷⁴ By 1887 however, John Williamson felt that mastering the “ticklish seam” was more a question of economy than the limits of mine engineering, reporting: “the question is greatly one of economy, which cannot be definitely answered without being tested.”⁷⁵ A year later, Williamson and Landale both concluded longwall working would be a suitable technique for extending the Devon Colliery under the river.⁷⁶ In 1898 a third mining engineer, David Rankin, noted that keeping “the working at a safe distance from the River Devon so as not to disturb its bed by subsidence or check the flow of water there in”⁷⁷ was critical to the performance of the mine, but felt the mine would be safe as long as the longwall method was not utilized and the stoops remained unworked. The 1898 agreement with Mr. Johnstone indicated that Rankin’s advice was followed by Alloa Coal; it stipulated the use of stoop and room as opposed to longwall technique and specified that Alloa Coal was “to continue the workings from Furnace Bank Pit and not to occupy any surface of Alva.”⁷⁸ The final significant underground expansion at Devon came about with the opening of a third and final pit in 1923⁷⁹ as a result of a rise in the demand for “Scots coal” in the 1920s.⁸⁰ The impact of these extensions was felt even on the surface landscape. The deeper, more extensive pits created by increased mechanization brought with them greater amounts of waste so that washing plants were installed in 1913⁸¹ and new washers, along with settling tanks, were necessary by 1926 when 600 tons of coal per day had to be separated from the dirt which

⁷⁴ *Ibid*, p. 7.

⁷⁵ National Archives of Scotland, John Williamson, Report on the best mode of working the Upper Five Foot seam of coal on the estate of Alva, CB24/150, 25 July 1887, p. 8.

⁷⁶ National Archives of Scotland, John Williamson and David Landale, Report as to the best mode of working certain seams of coal on the Estate of Alva under the basin of the River Devon, CB24/150, 13 January 1888.

⁷⁷ National Archives of Scotland, David Rankin, Report relative to the mode which should be adopted in working the coals under the Haugh lands in the Estate of Alva, CB24/150, 24 August 1898, pp. 5-6.

⁷⁸ National Archives of Scotland, Carmichael and Miller to Mackenzie and Kermack, CB24/150, 9 September 1909.

⁷⁹ Guthrie Hutton, *Mining From Kirkintilloch to Clackmannan and Stirling to Salamannan* (Ochiltree, 2000), p. 91.

⁸⁰ Carvel, *One Hundred Years in Coal*, p. 115.

⁸¹ National Archives of Scotland, J. B. Hamilton, Survey of the River Devon, AF62/2360, 23 August 1926, p. 4.

accompanied it to the surface.⁸² Steam power provided by the “large handsome and powerful boilers” installed for the 1880 re-opening of the colliery⁸³ powered the excavation of the pits as well as the hauling of the coal to the surface until 1922 when the colliery became electrified.⁸⁴ The transformation of the landscape brought about by greater quantities of pollution and waste continued to set the colliery space apart from its surroundings, creating an even greater degree of contrast to its rural surroundings than did the establishment of the industrial infrastructure in the previous period from which the waste ultimately resulted.

By the 1930s, the Devon Colliery site had become an even more self-sufficient space apart containing all the apparatus associated with a fully industrialized site from power sources to accommodation. A central generating plant for all Alloa Coal’s collieries was constructed at Devon to provide cheaper power to pump sections of the dip-field which were inundated with water. Four electric turbines pumped 4000 gallons per minute and a steam turbine pump dealt with 2200 gallons per minute so that in all, 20 to 25 tons of water could be raised for every ton of coal.⁸⁵ Even in the midst of the depression in 1936, Alloa Coal was optimistic enough about its coal producing capacity that it struck a deal with the London and North Eastern Railway to increase its siding accommodation from 119 wagons to 150 wagons and to relocate the loading zone to a safer, flatter area away from the pithead embankment at a cost of £312.⁸⁶ Finally, a year later, in 1937, in the face of rising materials expenditure, Alloa Coal expanded its operations into secondary industry on the site in the form of a brick

⁸² *Ibid.*

⁸³ ‘Operations at Devon’.

⁸⁴ Carvel, *One Hundred Years in Coal*, p. 114.

⁸⁵ Carvel, *One Hundred Years in Coal*, p. 129.

⁸⁶ National Archives of Scotland, Letter from the Divisional General Manager (Scottish Area), London and North Eastern Railway to Alloa Coal Company, CB24/150, 6 July 1936.

works to make bricks from colliery waste. Twenty four kilns created 30,000 bricks per day on the site of the former Devon Iron Works foundry until its closure in 1942.⁸⁷

Just a few years following its renovations of miners' quarters at Fishcross, Alloa Coal Company apparently felt the need for greater capacity to accommodate what must have been a growing workforce. In 1883, James Johnstone, under whose Alva Estate Alloa Coal had just begun to venture, agreed to sell miners houses and cottages at Carolina near Alva to the company.⁸⁸ Even more significant to the expansion of the colliery site to include accommodation as part of its edgelands designation, Johnstone also "agreed to grant Alloa Coal a supply of water for workmen's houses at Fishcross and the neighbourhood,"⁸⁹ this water supply was to originate

from that Spring situated immediately to the northwest of Alva gardens on the Estate of Alva, and to collect the same in a cistern to be erected by and at the sole expense of Alloa Coal Company...and to draw off the water...and lead the same by said pipe to Fishcross in a track...down by the Silverglen Burn along the side of the Turnpike Road and thence to Fishcross...by Alva Bridge.⁹⁰

Interestingly, this extensive undertaking of what would normally be termed a public works project was in fact a private one, even though just a decade prior, residents of Tillicoultry had demonstrated their view that sanitation was a public issue.⁹¹ Clearly, however, something set not only the colliery, but also its related infrastructure and subsequent pollution issues apart from the concerns of its nearest neighbours, thus maintaining it as an edgeland. This attitude was also apparent in minutes of the Scottish Board of Health from 1927 debating the need for a WC and cesspool at Howetown, located on the western edge of the colliery. Ultimately,

⁸⁷ Carvel, *One Hundred Years in Coal*, p. 147.

⁸⁸ National Archives of Scotland, Minute of agreement and grant between James Johnstone of Alva and Alloa Coal Company, CB24/150, 1883.

⁸⁹ *Ibid.*

⁹⁰ *Ibid.*

⁹¹ Evans, *Tillicoultry: A Centenary History*, p. 11.

WC accommodation was provided, but the Board of Health concluded that the “quantity of sewage...is comparatively small and the provision of a cesspool is not one of urgency.”⁹² A few years later, in 1931, Alloa Coal again took sanitation into its own hands by building bath houses on the grounds of the colliery which occupied “a commanding site above the River Devon.”⁹³

Up to mid-century, then, the location of the former Devon Colliery could continue to be defined as an edgeland in some of the most traditional senses of the concept. Despite its connections by rail transport to greater Clackmannanshire, human traffic to the site would have been restricted to employees of the colliery and the site would have been easily avoided by residents of Clackmannanshire journeying to and fro the various hillfoots villages. Miners’ villages at Fishcross and Sauchie intervened between any possible northern expansion of Alloa in the direction of the colliery, thus cutting the site off from possible urban integration as well. Its landscape now not only contained industrial infrastructure that the public preferred to ignore, its resulting pollution and waste had become an issue for which no one wished to take responsibility. Just as in twenty-first century edgelands, the Devon Colliery edgelands between 1880 and 1946 also relied on the operators of Alloa Coal for “basic public facilities” that would have “automatically” been provided by a town council⁹⁴ in a less “peculiar” space. The isolation of the site created by the industrial infrastructure that set it apart from its surroundings made the Devon Colliery an easy place to ignore.

In 1944, just prior to National Coal Board takeover of British mines, including the Devon Colliery, John Carvel described the total anthropogenic transformation of the site thus:

⁹² National Archives of Scotland, Scottish Board of Health to Mr. Hamilton, DD13/2662, 9 May 1927.

⁹³ Carvel, *One Hundred Years in Coal*, p. 162.

⁹⁴ Shoard, ‘Edgelands’, p. 131.

[L]ooking back across the valley from the main road into Tillicoultry it is possible to pick out the old slag-heap of the Iron Works projecting toward the river, but almost covered by the refuse of the modern colliery.... That is the only thing left to the passer-by to indicate the site of that early undertaking.⁹⁵

The natural environment had been completely dominated by the cultural, yet still, even in a history of those who had mastered this landscape, Carvel could not resist a description of the natural:

There is probably no Scottish county so underrated as Clackmannan. It is seldom mentioned as one of the beauty spots in the country.... From the primers in use one would never gather that the slopes rising from the plain of Clackmannan were grander than those in any other part of the range—grassland giving place to moorland, hillscape, romantic river stretches, deep ravines, woodlands, fertile carselands, all are here.⁹⁶

Although the site itself had evolved in its struggles between coal, iron and the environment, its physical location in a space with which it contrasted starkly remained obviously unchanged. The ambivalence of perceptions of Clackmannanshire noted by Carvel and his predecessors must have been due to the enigmatic nature of the county which, even in the second half of the twentieth century could not be classified as wholly industrial or wholly rural. Thus, Devon Colliery, as part of an ambiguous landscape remained an edgeland from NCB takeover in 1946 through its closure in 1960⁹⁷ and up to the mitigation of the site of the site by Central Regional Council (CRC) in 1977.⁹⁸

The National Coal Board inherited from Alloa Coal a fully mechanized, self-powering set of pits at the Devon Colliery that were more in line with “modern” NCB thinking than

⁹⁵ *Ibid*, p. 181.

⁹⁶ *Ibid*, p. 166.

⁹⁷ National Archives of Scotland, National Coal Board Scottish Division—Secretariat: Closure of Collieries: Devon, CB276/14/1, 30 March 1960.

⁹⁸ Stirling Council Archives, Central Regional Council, Department of Planning and Development, Regional Industrial Development Strategy, 29 June 1976.

were more conservative pit operations to the west,⁹⁹ thus transformations at the site by NCB were minimal during their tenure from takeover in 1946 to closure in 1960. Regarding the Devon Valley as “admirable for mining activities,” NCB in 1952 began operations to sink an enormous new mine at nearby Glenochil,¹⁰⁰ drawing resources, including manpower, from Devon Colliery. Still, in 1955, NCB continued to explore the idea of expanding mining blackband headings in the Oakmills section of the colliery, and ordered “consideration to be given to installing a Packmaster stowing machine for the stowing of the brushing.”¹⁰¹ The pros and cons of increased mechanisation were considered in 1956,¹⁰² but by 1957 “bad conditions still prevailing due to thin coal and heavy dirt”¹⁰³ began to point the way toward decreased coal production and on 3 November 1958 came the first references to equipment being salvaged from the face.¹⁰⁴ Salvaging continued even as 150 tons of coal was still being mined per day for two more years when a one line confidential notice reported that “Devon Colliery ceased production on Friday, 25 March, 1960.”¹⁰⁵ Pumps were withdrawn, girders salvaged, and engineers began dismantling of the surface plant by 10 May.¹⁰⁶ Thus, with the closing of Devon in 1960 and the embarrassing failure of Glenochil by 1961, “Clackmannanshire had declined from a County which was to produce a large percentage of Scotland’s coal”¹⁰⁷ to one which the coal industry could increasingly ignore.

⁹⁹ Hutton, *Mining from Kirkintilloch*, p. 50.

¹⁰⁰ Evans, *Tillicoultry: A Centenary History*, p. 75.

¹⁰¹ National Archives of Scotland, National Coal Board Scottish Division, Alloa area, Devon Colliery minutes of planning meeting, CB276/1/1, 10 January 1955.

¹⁰² ‘Mine Mechanisation’, *Stirling Journal*, 12 April 1956.

¹⁰³ National Archives of Scotland, National Coal Board Scottish Division, Alloa area, Devon Colliery minutes of planning meeting, CB276/1/1, 1 April 1957.

¹⁰⁴ National Archives of Scotland, National Coal Board Scottish Division, Alloa area, Devon Colliery minutes of planning meeting, CB276/1/1, 3 November 1958.

¹⁰⁵ National Archives of Scotland, National Coal Board Scottish Division—Secretariat: Closure of Collieries: Devon, CB276/14/1, 30 March 1960.

¹⁰⁶ National Archives of Scotland, National Coal Board Scottish Division, Alloa area, Devon Colliery minutes of planning meeting, CB276/1/1, 10 May 1960.

¹⁰⁷ Evans, *Tillicoultry: A Centenary History*, pp. 76-77.

The story of the transformation of the colliery landscape did not end with the abandonment of the mine. Two years after closure, NCB was forced to audit a situation involving the salvage of 25 to 30 tons of scrap remaining at the site by W. M. Kerr, a scrap metal merchant from Stirling.¹⁰⁸ According to NCB, the area purchasing and stores management who were responsible for the general control of disposal of the site passed along their duties to the area workshops manager who showed “serious laxity in creating sound agreed inventories of material for disposal, documentation, and coordination” of scrap uplift.¹⁰⁹ On 6 September when Kerr showed up to collect the scrap, the winding engineman and the sub-station attendant were the only ones on duty. The windingman gave Kerr the key and from there nothing more is known. No lists of items exist to show what Kerr salvaged, and there is no record of the loaded lorries actually turning up at the brickworks to be weighed. In the end, though NCB got payback by using Kerr’s own crane to “tidy up the compound” on 12 September 1962.¹¹⁰ This story is significant for more than just its slightly sordid details. It is a story of questionable behaviour that could only have occurred in a classic edgeland location, where, by definition, oversight is lax. The process of returning the built to the natural as exemplified by the uplift of scrap is one closely associated with the edgeland concept. In the case of the colliery, this return to the natural was only one step in the evolution of the site as an edgeland, rather than the defining step it would be under the traditional notion of edgeland formation.

Regardless of the exact details surrounding the abandonment by NCB of the Devon Colliery site, the site remained disused for 15 years between 1962 and 1977 and, along with

¹⁰⁸ National Archives of Scotland, National Coal Board Scottish Division: Internal Audit Branch, Alloa area: Enquiry into the control of uplifting of scrap from Devon Stores Compound by a scrap merchant between 6th and 10th September 1962, CB276/24/1.

¹⁰⁹ National Archives of Scotland, National Coal Board Scottish Division: Internal Audit Reports on Plean and Devon Collieries: Memorandum by Finance Director for discussion at the Executive Committee Meeting, CB276/24/1, 18 December 1962.

¹¹⁰ National Archives of Scotland, National Coal Board Scottish Division: Internal Audit Branch, Alloa area: Enquiry into the control of uplifting of scrap from Devon Stores Compound by a scrap merchant between 6th and 10th September 1962, CB276/24/1.

1400 other acres in the Central Region,¹¹¹ was officially classified as “derelict” by the Scottish Development Agency in 1975 under the auspices of the Town and Country Planning Act (Scotland) 1975.¹¹² In 1974 the bing was described thus:

The Devon colliery tip consists of an elongated mound running approximately north-south with several slurry lagoons on the east side and a larger lagoon below the north-east face of the tip. It contains 1,250,000 tons of spoil...is 53 m high and covers 4.8 ha. The spoil consists of 75% ‘run-of-mine’ dirt and 25% washer discard. Such discard is mainly blaes with some sandstone and fireclay. Total phosphate levels in the spoil (675 ug/g spoil) were similar to those found in sand dunes.¹¹³

In their 1976 regional industrial development strategy report, the Central Regional Council (CRC) noted: “The site of the former colliery [consists of] 7.5 acres with the pithead buildings still on site, many in poor condition. The site has a poor access and is not well related to the labour market. The Colliery and tips are to be rehabilitated by the Region but it is not an attractive industrial site.”¹¹⁴ As a derelict, unused space, the former colliery site was now, inarguably, an edgeland. Even though the CRC mitigated other similar sites for more specific purposes, it acknowledged that the former Devon Colliery was perceived as being too isolated for a new industrial site. All the same, the CRC went ahead with mitigation for apparently environmental purposes, even though the site remained unplanned for another decade.¹¹⁵ In this case, the clean-up of the site did not result in the loss of edgeland status. If anything, rehabilitation plans made even more possible the perpetuation of the site’s edgeland legacy.

¹¹¹ Stirling Council Archives, Central Regional Council, Department of Planning and Development, Rehabilitation of Derelict Land: Five-Year Programme, 22 January 1979.

¹¹² Stirling Council Archives, Central Regional Council, Department of Planning and Development, letter from the Scottish Development Agency to the Central Regional Council, 9 February 1976.

¹¹³ M. J. Daft and T. H. Nicholson, ‘Arbuscular Mycorrhizas in Plants Colonizing Coal Wastes in Scotland’, *New Phytologist*, 73 (1974), p. 1130.

¹¹⁴ Stirling Council Archives, Central Regional Council, Department of Planning and Development, Regional Industrial Development Strategy, 29 June 1976.

¹¹⁵ Stirling Council Archives, Central Regional Council, Land and Buildings Committee, Devon Colliery Rehabilitation Site—Proposed Cross-Country Horse Course, LB9, CR1/1/ 22, 9 May 1985.

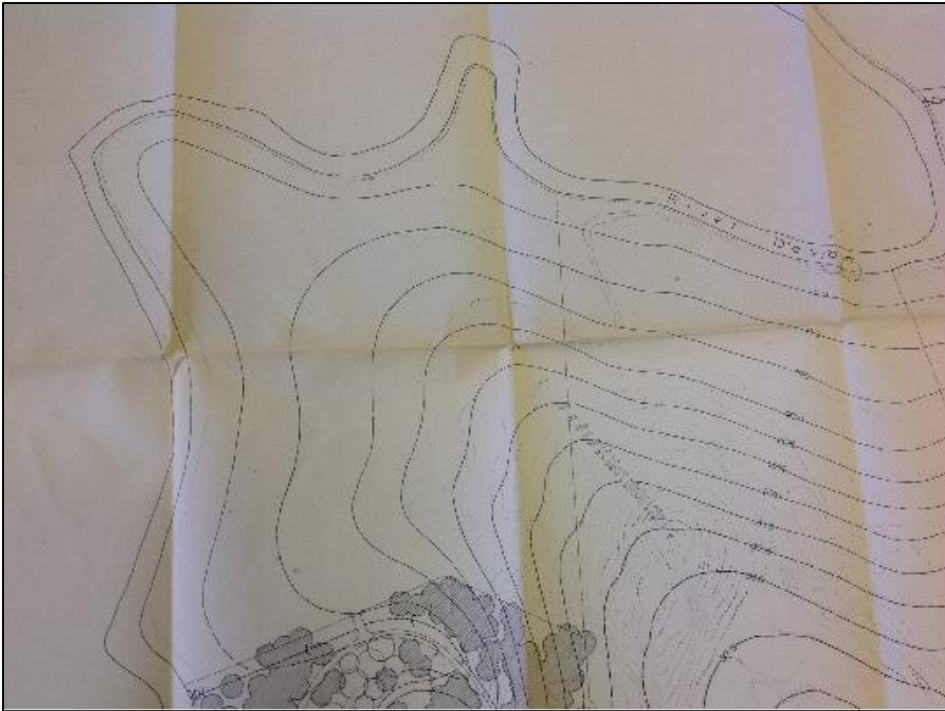


Fig. 7: Mitigation plans for the Devon Colliery bing¹¹⁶

Plans drawn by the CRC in 1977 (see fig. 7) for the rehabilitation of the derelict land at Devon Colliery show a tip 72.5 meters high adjacent to a space directly to the east consisting of extremely irregular, haphazard contours, with a peak elevation of 45 meters.¹¹⁷ An article in *The Scotsman* estimated the tonnage of waste at 40,000.¹¹⁸ The proposed rehabilitation included spreading these 40,000 tons of waste north west to create a ten meter high bank on the Devon as well as using the spoil to even out the irregular contours on the east side of the bing so that at its highest elevation, the tip would measure 41 meters. The plans also indicate proposed plantings of a “deciduous/conifer mix planted as whips and forest transplants” along the boundaries of the rehabilitated bing.¹¹⁹ Meanwhile, soils were “being lifted from the low-lying agricultural land...the soils will be returned to cover the

¹¹⁶ National Archives of Scotland, Map showing Rehabilitation of Derelict Land at Devon Colliery near Fishcross, DD27/5114, 22 February 1977.

¹¹⁷ *Ibid.*

¹¹⁸ ‘Scottish Development Agency Sanction Heritage Plans’, *The Scotsman*, 1 December 1976.

¹¹⁹ National Archives of Scotland, Map showing Rehabilitation of Derelict Land at Devon Colliery near Fishcross, DD27/5114, 22 February 1977.

reshaped site...ready for grass seeding and tree planting in the Autumn.”¹²⁰ The actual mitigation of the site began on 30 August 1976 with the extraction of slurry of “marketable quality” by the South of Scotland Electric Board¹²¹ for use at the Methil Power Station.¹²² A year later, on 4 October 1977 rehabilitation of the bing itself began. According to the CRC’s Planning and Development Committee’s Progress Report on Rehab Schemes:

The colliery spoil tip has been re-graded over the surrounding low-lying ground which was subject to flooding. Grass sown over the site about 6 weeks ago is now well-established and the rehabilitated area has been divided by fencing into suitable parcels for grazing. Tree planting will take place during the Winter. The Colliery beam engine house has been retained.¹²³

By January of 1979, I. Webster, the chief assistant director of planning for the CRC wrote to the Scottish Development Department that “the derelict land rehabilitation scheme at the colliery is now virtually complete and I should like to undertake the proposed work to the Beam Engine House during the coming Spring.”¹²⁴ Finally, on 19 April 1979, the rehabilitated Devon Colliery site extending to 131.39 acres was purchased by the CRC from NCB.¹²⁵ It could be argued that the deliberate “wilding” of the space by removing environmental hazards and returning the land to a more rural-looking landscape of grass and trees makes the location ineligible for edgeland status; however, the effort to return the land to an agricultural state in conjunction with preserving the legacy of coal mining via the

¹²⁰ Stirling Council Archives, Central Regional Council, Department of Planning and Development, Rehabilitation of Derelict Land Progress Report on Schemes, PD109, CR1/1/6, 25 October 1977.

¹²¹ ‘Scottish Development Agency Sanction Heritage Plans’.

¹²² Stirling Council Archives, Central Regional Council, Department of Planning and Development, Central Regional Council Report to Planning and Development Committee, Scottish Development Agency Rehabilitation Programme—Progress Report, PD122, CR1/1/4, 14 September 1976.

¹²³ Stirling Council Archives, Central Regional Council, Department of Planning and Development, Progress Report on Rehab Schemes, PD 168, CR1/1/8, 30 October 1978.

¹²⁴ National Archives of Scotland, I. Webster, CRC to I. Maxwell, SDD, DD27/5114, 16 January 1979.

¹²⁵ Stirling Council Archives, Central Regional Council, Land and Buildings Committee, CRC Acquisition of Land and Property, LB 7, CR1/1/10, 19 April 1979.

restoration of the beam house¹²⁶ actually echoed the initial development of the space as edgeland between farming and industry two hundred years prior by the Erskines and Balds.

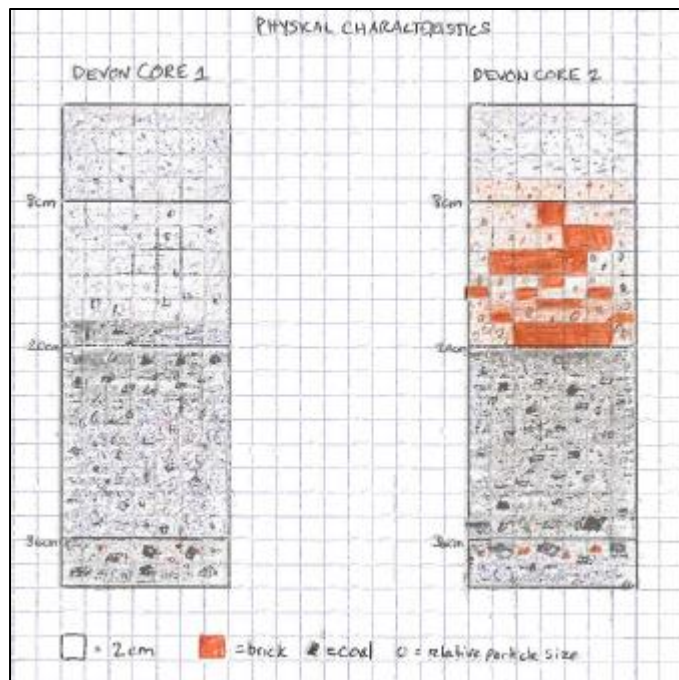


Fig. 8: Drawings of the physical characteristics of the Devon Cores

Analysis of the physical characteristics of the two core soil samples taken from the mitigated bing¹²⁷ provide some possible visible corroboration of various natural and anthropogenic activities on the site beginning with the 1977 mitigation. As would be expected, the top 8 cm of core 1, taken closest to the south bank of the River Devon, (see fig. 8) is wetter, softer, smoother and more firm than the corresponding top layer of the core 2 (see fig. 8). At a depth of 10 cm, both cores become much less firm and contain significantly more small angular stones, and by 22 cm deep, coal particles appear in cores 1 and 2 (see fig. 8). One important difference between the two samples at this depth is the existence of significant chunks and particles of brick in core 2 measuring from between 1 and 8 cm.

¹²⁶ Stirling Council Archives, Central Regional Council, Land and Buildings Committee, Report by Estates Manager, LB113, CR1/1/10, 20 September 1979; CRC, Department of Planning and Development, PD57, CR1/1/10, 28 May 1979; CRC, Department of Planning and Development, Report of Tenders Accepted by SDA: Devon Colliery (Beam Engine House), PD171, CR1/1/10, 3 March 1980.

¹²⁷ See appendix A for sampling procedures.

Between 22 cm and 34 cm, the two cores show variation between each other, with core 1 becoming stonier, darker in colour and more friable. Core 2 is firmer than Core 1 to a depth of 28 cm before it becomes more similar again to core 1 (see fig. 8). Beginning at 36 cm deep and continuing to the bottom of the core, there is evidence of a final notable change in the physical characteristics of the sample. At 36 cm deep, core 1 contains fine red particles which not as stony as the orange brick particles found in core 2, although core 2 at this depth also contains brick particles surrounded by more friable material. Core 1 is much stonier at this depth than core 2, though both cores begin to resemble their characteristics at 30 cm (see fig. 8).

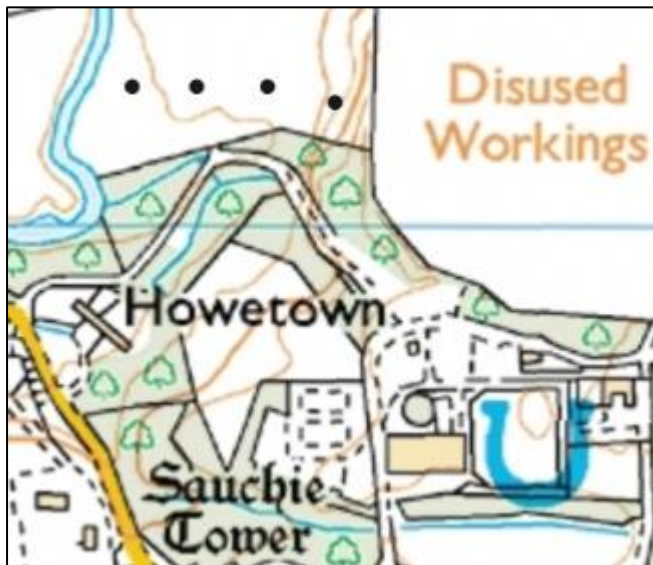


Fig. 9: Map showing transect of cores¹²⁸

Between the depths of 0 and 10 cm, the firm, wet qualities of core 1 could possibly be accounted for by the drainage off the slope of the mitigated bing. The firmness of core 2 at the corresponding depths may indicate that water cannot penetrate the surface very well, and is instead acting as run off and accumulating in the location of core 1. Periodic flooding of the Devon would also, of course, make this location wetter than that of core 2. However,

¹²⁸ Ordnance Survey license number 10020783 (2011).

there are no human activities that might account for these characteristics, including a lack of evidence for the importation of the “soils from low lying areas” indicated in the CRC’s mitigation plans that would seemingly have formed the top layer of the rehabilitated site. On the other hand, the evidence of significant amount of brick material found in core 2 may be accounted for by the brick factory run by Alloa Coal between 1937 and 1942. The factory was located at the site of the former Devon Iron Works foundry, directly at the top of the slope on which lies the sampling transect (see fig. 9). Mitigation efforts to regrade this slope by pushing its top in the direction of the transect line could have resulted in the deposition of a layer of brick waste material in the location of core 2.

The physical properties of the two core samples could provide some evidence of the quality and functionality of the former colliery’s soil. Soil quality, or the “capacity (of soil) to function”¹²⁹ is, according to Karlen et al, a “...way to document soil condition, response to management, or resistance to stress imposed by natural forces or human uses.”¹³⁰ In this case, the current poor condition of the site’s soil¹³¹ bears out the long history of natural as well as anthropogenic activities at Devon Colliery. Soil quality has necessarily limited the functions of the site, yet its functionality allowed it to retain its edgeland legacy despite mitigation.

Despite its poor quality and limited functionality, in the mid-1980s, both the CRC as well as the Clackmannan District Council (CDC) attempted to transform the site in a manner that, if successful, would finally destroy the site’s two hundred year legacy as an edgeland. In May of 1985, the CDC and the CRC gave joint approval to a proposal by the British Horse

¹²⁹ Douglas L. Karlen, Craig A. Ditzler, and Susan S. Andrews, ‘Soil Quality: Why and How?’, *Geoderma*, 14 (2003), p. 147.

¹³⁰ *Ibid*, p. 146.

¹³¹ For quality standards for British soils, see Stephen Nortcliff, ‘Standardisation of Soil Quality Attributes’, *Agriculture, Ecosystems and Environment*, 88 (2002), pp. 161-168.

Society for a cross-country horse course for national events.¹³² Plans involved “formation of an all-weather arena and ancillary facilities” on land to be transferred to the CDC who would undertake the management of the site for a period of 20 years.¹³³ Four years later, on 11 December 1992, the equestrian centre officially opened complete with “purpose built indoor facilities, outdoor dressage areas, jumping and warm up areas.”¹³⁴ In its 1992 annual report, the CDC also noted that work had begun on the beam house for meeting rooms, offices for countryside ranger services and an exhibition area.¹³⁵ Clearly, the CDC was doing its utmost to fulfil its charge of promoting tourism, leisure and recreation, but at the cost to the site’s legacy as an edgeland. The space was now certainly not “wild,” but neither was it urban. It served as a centre which drew the public in for specific, planned activities, unlike most traditional edgelands where the public is freer to wander without purpose. The human hand of two councils plus the equestrian centre itself had deliberately moulded the space into something else, and for a period of twenty years, until 2009 when poor financial performance and harassment of the management by the neighbours forced the current tenants to give up their lease,¹³⁶ the site of the former colliery would not have qualified as an edgeland.

These two decades were, however, an anomaly in the two hundred year history of the site. Following the equestrian centre debacle, CDC accepted the Scottish Society for the Prevention of Cruelty to Animal’s (SSPCA) proposal to demolish the centre and build their

¹³² Stirling Council Archives, Central Regional Council, Land and Buildings Committee, Devon Colliery Rehabilitation Site—Proposed Cross-Country Horse Course, LB9, CR1/1/ 22, 9 May 1985.

¹³³ Stirling Council Archives, Central Regional Council, Land and Buildings Committee, Devon Colliery Rehabilitation Site—Proposed sub-national equestrian centre, LB256, CR1/1/26, 25 February 1988.

¹³⁴ Clackmannan (Scotland) District Council, *Annual Report and Accounts 1992-1993* (Alloa, 1994), p. 9.

¹³⁵ *Ibid.*

¹³⁶ Muir Wilson, ‘Devon Equestrian Centre-Report by External Audit, Clackmannan District Council, 9 September 2009’,

<http://www.clacksweb.org.uk/council/reports/?title=equestrian+centre&author=&bodyid=&catid=&fromm=&fromy=&tom=&toy=&so=category&sub=1>. [Accessed 10 April 2014]. No further details of the harassment are available other than it caused the manager of the centre to go on sick leave.

rescue centre along with two houses for management accommodation on the site.¹³⁷

Although these changes were not substantive enough to qualify as landscape transformation, the Council's purpose was inadvertently to return the location to its edgeland status.

Approval of the SSPCA's proposal would take full advantage of the quasi rural and protected, isolated nature of the site for the care of its wildlife. Finally, the landscape would have a use fitting of its functionality as well as its two century legacy as an edgeland.

Decisions such as this one made by the CDC lie at the heart of classic notions of edgeland management: how to manage spaces in a way that does not interfere with their functionality, yet allows them to be environmentally sustainable.

¹³⁷ Keith Johnstone, 'Report of handling on planning application—Demolition of existing Devon Equestrian Centre Building and construction of SSPCA National Wildlife Centre with 2 houses for management accommodation at Equestrian Centre, Fishcross, Planning Committee, 9 February 2010', <http://www.clacksweb.org.uk/council/reports/?title=equestrian+centre&author=&bodyid=&catid=&fromm=&fromy=&tom=&toy=&so=category&sub=1>. [Accessed 10 April 2014].

Chapter II

Economics versus the Environment

While the idea that “edgelands management” is a contradiction in terms is one of Shoard’s most important contributions to the edgelands debate, her notions do not give due consideration to the management decisions that created the edgeland space in the first place. Decisions made by the Erskines and Balds between 1792 and 1835 weighed the importance of profits versus landscape change; this dilemma helped establish the origins of the Devon Colliery as an edgeland. The choices of mining techniques made by the first two managers of Alloa Coal, William Paton and William Wallace, between 1835 and 1873 may not have been made expressly to protect the environment, but the results of their decisions often inadvertently did so. Paton’s and Wallace’s conservative management of Devon Colliery at this time meant that the landscape was preserved as an edgeland, somewhere between rural agriculture and full urban industrialization. The key turning point in the management of the site came in 1873 when the new manager, Alexander Roxburgh began to prepare for the reopening of the Devon Colliery. Although Roxburgh continued to preside over mining technique debates through the following two decades, these debates were always resolved in favour of profits over the environment. By 1899, when James Bain took over management, degradation and pollution resulting from the now fully-industrialized Devon Colliery set the colliery completely apart from its neighbours. The site then maintained its status as an edgeland through the first half of the twentieth century and on into National Coal Board (NCB) management from 1946 to 1960. The years of abandonment and lack of oversight by either NCB or any of the various regional authorities until 1977 were the years of the site as classic edgeland; neither managed or regulated nor assigned another purpose. However, management by regional authorities from 1977 to the present resulted in a resolution of the

edgelands conundrum; they were able to simultaneously mitigate and preserve the legacy of the former Devon Colliery as an edgeland.

Thanks in large part to the efforts of John Francis Erskine in the latter half of the eighteenth century, the *Old Statistical Account (OSA)* noted that “[T]he improvement of agriculture has, indeed, been most uncommonly rapid in this little corner, perhaps more so than in almost any other.”¹ Erskine himself was so engaged with agricultural improvement in Clackmannanshire that in 1795 he wrote an entire volume on the subject in which he recommended that “almost the whole of the lands [along the banks of the Devon] would turn to most account, if they were appropriated solely to pasture.”² Erskine also advocated for an increased turnip crop,³ criticized the traditional three crop rotation⁴ and pointed out that while no irrigation existed in Clackmannanshire at the time of his writing, “many parts of this district may be flooded with great advantage.”⁵ However, in addition to his agricultural passions, Erskine was seriously involved in the development and management of industry along the River Devon, most notably his colliery on the Devon which supplied the coal for the adjacent Devon Iron Works.⁶ As evidence of his commitment to industrial activity on his estate, Erskine invested in professional, technical advice by first hiring Alexander Bald, then Bald’s son, Robert to manage his collieries.⁷

The Erskines and the Balds, then, were an unusual partnership united in managing diverse activities on a common piece of land. They were responsible for the management and

¹ Alloa, County of Clackmannan Account of 1791-1799, *The Old Statistical Account*, vol. 8, p. 604. (accessed online)

² John Francis Erskine, *General View of the Agriculture of the County of Clackmannan and some of the adjacent parishes, situated in the counties of Perth and Stirling* (Edinburgh, 1795), p. 11.

³ *Ibid.*, p. 41.

⁴ *Ibid.*, p. 54.

⁵ *Ibid.*, p. 83.

⁶ Baron F. Duckham, *A History of the Scottish Coal Industry, Volume 1: 1700-1815, A Social and Industrial History* (Newton Abbot, 1970), pp. 149-150.

⁷ John Lees Carvel, *One Hundred Years in Coal, the History of the Alloa Coal Company* (Edinburgh, 1944), p. 16.

planning of the initial landscape transformations described in the previous chapter which helped to establish the space as an early edgeland. Although they certainly did not qualify as environmental managers, decisions made by Erskine and the Balds did weigh the importance of the environment versus economy, thereby challenging the normative perceptions of estate ownership and industrialization that economic consideration overrode environmental concerns in landowners' quests for profits. The planning and management of the Devon Colliery site was not a straightforward question of sacrificing the environment for economy and the results of the dilemmas arising from this issue formed the basis for a permanent edgeland. The classic notion of an edgeland involves the paradox of managing an area that exists, by definition, because it is not managed. However, in establishing a broader historical perspective of edgelands, it becomes clear that a contemporary edgeland is a decayed relic of a landscape that must have been managed at one time, or else it would be merely designated rural or even wild. There is no reason why the prior management of a contemporary edgeland cannot be considered in determining whether or not a site should be designated as edgeland, and in the case of the former Devon Colliery, management choices had a direct impact on the qualities of the site as an edgeland.

While as a landowner John Francis Erskine's interest in the environment of his estate would have most likely been primarily economic in nature, his awareness of its natural qualities indicates he was not just interested in exploiting his land for profit, he also wished to preserve and enhance what he believed to be the best natural qualities of his estate. To this end, Erskine's relationship with Robert Bald, a man of similar mind set who complemented his employer's descriptions of the agricultural landscape with prolific, precise and eloquent details about the coalfields of Clackmannanshire, proved to be most advantageous. Even more prescient than Bald's geologic descriptions was his application of his understanding of geology to environmental change. He wrote:

Though the total removal of the alluvial cover might, in one view, appear to be of great advantage, in affording facility in ascertaining the strata existing in any district, yet this advantage would be greatly outweighed by the disadvantages, not only in the want of soil for cultivation, but, by the strata being denuded, the coal-mines would be deluged with water every rainy season, whereas the alluvial cover affords protection, by causing the water to flow along the surface till it join the rivers, which are the great natural drains for the water on the surface of the earth.⁸

It is almost as though Bald anticipated opencast mining more than one hundred years before its advent. On the surface it may seem from this passage as though Bald were making an economic case for resisting the temptation to ruin farmland in favour of garnering greater profits from coal. In fact in his 1808 publication *The Coal Trade of Scotland*⁹ he pointed out that “Before the lapse of another century, all the fittings of collieries presently working will be finished, and the increased depth of the pits which must of course follow...will tend to increase the price of coal.”¹⁰ While these two examples support the normative perception that the only “concerns” for the environment involved the economic consequences of its changes, the main thrust of Bald’s writing is around the idea that economic considerations did have an impact on the natural world.

The most significant management decision the Balds would have had to make concerning Erskine’s mining operations involved whether to adopt the longwall method of hewing coal or to continue using the more traditional post-and-stall technique. The post-and-stall or stoop-and-room method in which small “rooms” or “stalls” were created by extracting small amounts of coal from the seam¹¹ resulted, in Bald’s estimation, in 7/15 of the coal being left behind in immense pillars, amounting to some 60,000 tons of lost coal along the

⁸ Robert Bald, *On the Coal Formation of Clackmannanshire* (Edinburgh, 1819), p. 23.

⁹ Robert Bald, *A General View of the Coal Trade of Scotland, Chiefly that of the River Forth and Mid Lothian* (Edinburgh, 1808).

¹⁰ *Ibid*, p. 113.

¹¹ Michael Flinn, *The History of British Coal Volume 2: 1700-1830* (Oxford, 1984), p. 82.

Forth.¹² The alternative to post-and-stall mining was longwall hewing which involved working a broad seam of coal while supporting the roof with timber props until accumulated waste could replace these supports.¹³ Bald also emphasized the mine waste created by longwall mining in which "...the art of the collier is to hew down immense blocks of coal, in size from one to four cubic yards at a time. In this operation, a quantity of dross or culm is produced in every colliery."¹⁴ Bald's argument was that customers believed that coal in large masses was of a superior quality to that of the smaller "chews," yet once in their own homes, people spent a good deal of time and energy breaking up large blocks of coal.¹⁵ This perverse desire for large coals created waste of "many thousand tons of chows...every year,"¹⁶ and in many collieries, "...immense quantities of lime-coal and culm are left behind in the workings or waste of the pits...where it appears to occupy half of the excavation made by the working of the great coal."¹⁷ In addition to economic implications, Bald understood that either mining technique resulted in environmental consequences. Leaving behind small coals in the pillars of the post and stall technique necessitated seeking more coal by opening up new seams and digging deeper pits. However, if longwall was used in these new mines, even greater environmental degradation on the surface resulted. Bald wrote: "[W]e very naturally say, that our coal-mines are inexhaustible; but this is not the case. Even if the Grampian mountains were composed of coal, we would ultimately bring down their proud and cloud-capped summits, and make them level with the vales."¹⁸ Serving the demands of the coal market would have been reason enough to strip mine the Highlands but Bald's use of language in his description indicated an understanding that while a change in environment

¹² Bald, *A General View of the Coal Trade of Scotland*, p. 70.

¹³ Flinn, *The History of British Coal Volume 2*, p. 83.

¹⁴ Bald, *A General View of the Coal Trade of Scotland*, p. 47.

¹⁵ *Ibid*, p. 50.

¹⁶ *Ibid*, p. 48.

¹⁷ *Ibid*, p. 69.

¹⁸ *Ibid*, p. 113.

would yield economic gain. The impact on the environment would be of greater consequence than any possible increase in profit margin.

At the turn of the century Devon Colliery, the Balds most likely decided in favour of post and stall mining, despite the fact that the *New Statistical Account (NSA)* reported in 1830 that “all coals in the parish were wrought by post and stall method as it is termed...till within these 30 years when the Shropshire [longwall] method was introduced.”¹⁹ However, the *NSA* also noted that “[I]n the Collyland colliery, post and stall is used the coal being too thick for working in the Shropshire system with economy.”²⁰ Bald’s duties extended to the Collyland; this along with the fact that reports from even later in the nineteenth century indicate that post and stall was still the preferred technique at Devon, indicate that Bald almost certainly stuck with the more conservative mining method even into the nineteenth century. Possibly this was an attempt, as Bald himself put it, to allow him and Erskine to serve as “good husbands of that which so very materially concerns those who are to succeed us.”²¹ As they set out to transform the Erskine estate, Bald and his boss were not only making economic decisions based on how much they could maximize profits from mining and farming. They were also making decisions based on the natural characteristics of the land. Ultimately, these decisions would have had not only an economic impact, but also an impact on the landscape. In using the post and stall system, Bald was avoiding the costs of sinking new shafts and deepening pits which were already the deepest in the country,²² but he was also avoiding the environmental consequences of this choice. This unique decision created an early industrial

¹⁹ Alloa, County of Clackmannan Account of 1834-1935, *The New Statistical Account*, vol 8, p. 28. (accessed online).

²⁰ *Ibid.*

²¹ Bald, *A General View of the Coal Trade of Scotland*, p. 113.

²² Bald, *On the Coal Formation of Clackmannanshire*, p. 18.

landscape that attempted to coexist with “the natural sublime”²³ by respecting the natural qualities of the land.



Fig. 10 Map showing various collieries leased by Alloa Coal and Robert Bald²⁴

During the course of his tenure as Erskine’s manager, in addition to his duties at the pithead, Robert Bald had become something of a zealous social reformer, regulating the consumption of whisky by his colliers “...with the alone object of doing you good” as well as promising “regulations regarding the promoting...of other measures tending to your happiness, comfort and respectability.”²⁵ By 1835 John Francis Miller Erskine and Bald had come to a parting of the ways. Erskine was dissatisfied with Bald’s attention to matters away from the pit, but it was Bald who ultimately gave Erskine an ultimatum, demanding that Erskine give him full leeway in management of the mines both above as well as below ground, or that Bald would take over the lease in 1835 and run the pits himself. As a result, Bald gained the tack for Collyland, Woodlands and Devonside collieries, while William

²³ Gavin Bridge, ‘Contested Terrain: Mining and the Environment’, *Annual Review of Environment and Resources*, (29) 2004, p. 243.

²⁴ John Thomson, ‘Perthshire with Clackmannan’, *Atlas of Scotland* (Edinburgh, 1827), <http://maps.nls.uk/atlas/thomson/531.html>. [Accessed 8 August 2014].

²⁵ Robert Bald, *Notice: to the colliers, workmen and others, employed and residing at the Alloa, Collyland, and New Sauchie Collieries* (Alloa, 1832).

Mitchell and John Moubray took over the rest of Erskine's leases, including Devon Colliery and formed the Alloa Coal Company (see fig. 10). Unfortunately, in less than a year Bald's pits also passed into the hands of Alloa Coal.²⁶ The head of the Iron Works at the time of the formation of Alloa Coal, Alexander Meldrum, agreed to work closely with the coal company, eventually surrendering its coal lease to them in 1843 before closing in 1858.²⁷

Transformations in the landscape resulting from the decisions made by subsequent managers of Alloa Coal were inevitable. However, unlike those made by the Erskines and Balds, the decisions made by the Alloa Coal Company and the Devon Iron Works between 1835 and 1880 gradually began to coincide with more normative perceptions of industrial leaders as giving profit far greater consideration than the impact of their industry on the environment. Still, questions of mining techniques and whether or not they were chosen for their economic or environmental implications had important consequences for the continuation of the site's designation as an edgeland.

According to leases between Alloa Coal Company and Devon Iron Works from 1837 and 1838, Alloa Coal agreed to "sink pits and work coal in the North Sauchie Coal," which included the Devon Colliery site, "upon paying Devon Iron Works a royalty of nine pence per ton as long as they pumped the water in their working into the nine feet waste."²⁸ A year later, the subtrack from Devon Iron Works to Alloa Coal noted that Alloa Coal was:

...also expected to keep regular plans of the workings made up yearly and to exhibit them to the said Devon Company. [Alloa Coal] must work the coals hereby let in a fair regular and orderly manner and to keep the levels always open and to leave sufficient and substantial pillars along the water levels or drifts and allow the Proprietor...to visit the said coal underground.²⁹

²⁶ Carvel, *One Hundred Years in Coal*, p. 23-27.

²⁷ *Ibid*, pp. 34, 46, 48.

²⁸ National Archives of Scotland, Agreement between Alloa Coal and Devon Iron Works, CB24/150, 1837.

²⁹ National Archives of Scotland, Subtrack Devon Iron Works to Alloa Coal Company, CB24/150, 1838.

Similar language describing the use of post-and-stall mining as well as the expectations for the maintenance of the site was also used in the 1849 lease between the Earl of Mansfield and Alloa Coal. The lease included the note that: "...the lessees shall be bound...to restore the ground occupied by such pits, roads or waggon ways that are not necessary for the future carrying on of the colliery."³⁰ As manager from 1835 to 1865, did William Paton help influence the decision to continue to mine more conservatively so as not to cause the Alloa Coal Company to fail economically? After all, the big steam push in manufacturing was still in the future, and coal mining remained on a fairly small scale nationally until after 1850, so perhaps Paton and Alloa Coal simply did not yet have economic incentive to use more modern techniques. Regardless of their reasoning, according to the language of the leases, those involved in mining decisions were aware that there were environmental as well as economic implications stemming from these technical decisions. The fact that the environment was at least partially protected during the life of these leases cannot be denied. Once again, the respect for the natural qualities of the land prevented it from becoming fully industrialized, resulting in an ambiguous territory, or edgeland, in which the "landscape of mining" continued to exist in the same space with "pre-industrial integrity and harmony."³¹

By far the biggest decision weighing the environment versus profit dilemma faced by Alloa Coal Company over the course of a twenty year period was the closing and subsequent re-opening of the Furnacebank pit at Devon Colliery. Even while Alloa Coal was bound by an 1851 minute of agreement "to make a new winning to the dip of this leasehold under a penalty of paying full compensation for such of the coal as may be left unworked" and that "the site of this new winning was to be fixed at Furnace Bank,"³² water problems threatened both this new project as well as William Paton's existing workings. Water had always been

³⁰ National Archives of Scotland, Lease between the Earl of Mansfield and Alloa Coal Company, CB24/161, 1849.

³¹ Bridge, *Contested Terrain*, p. 243.

³² National Archives of Scotland, Report by Mackenzies and Cowan on Sauchie Coal Field, CB24/143, 1871, pp. 3-4.

an issue on the site; the 1838 subtrack from Devon Iron Works to Alloa Coal noted that Alloa Coal were required to "...at their own expense to pump the water that may collect in the said five feet seam of coal to the surface and not to allow any of the water to pass or enter from the said five feet seam into any of the other seams of coal now working...in the said North Sauchie coalfield."³³ By 1854, water overpowering the North Sauchie pumping engine responsible for pumping out Devon Colliery, "dull trade" with the Iron Works,³⁴ and the "ill advised mines" at nearby Glenfoot (see fig. 10) which "gave a good deal of additional water to Sauchie Colliery"³⁵ all would have influenced Paton's decision. Not only did Paton determine to "defer the completing of this Furnace bank fitting and let the water rise over Mr. Johnston's operations" in 1854,³⁶ he also decided to stop pumping the existing pit, allowing "the enormous waste, extending for miles on the south, east and west...to fill with water."³⁷ Again, the question arises as to whether Paton made these decisions based on economic or environmental impact. Alloa Coal had already invested £4621 in preparations for the new pit when Paton decided to stop pumping,³⁸ so it seems unusual that the company would change course unless there were monumental environmental concerns that would convince them to do otherwise. Regardless of whether their reasoning was environmental or economic, the consequences of Alloa Coal's decision did have implications for environmental quality, including the effect of millions fewer gallons of water spewing into the River Devon every day, or the opposite effect of the wastes filling with water and possibly causing subsidence. Even by mid-century, the conservative nature of Alloa Coal's management helped to preserve

³³ National Archives of Scotland, Subtrack Devon Iron Works to Alloa Coal Company, CB24/150, 1838.

³⁴ Carvel, *One Hundred Years in Coal*, p. 50.

³⁵ National Archives of Scotland, David Landale, Report on the Sauchie and Alloa Collieries, CB24/143, 31 July 1865, p. 3.

³⁶ *Ibid.*

³⁷ 'Extensive Mining Operations at Devon', *Alloa Advertiser*, 9 September 1882.

³⁸ National Archives of Scotland, Report by Mackenzies and Cowan on Sauchie Coal Field, CB24/143, 1871, pp. 3-4.

its landscape as an edgeland somewhere between mining as an industry, and mining as an extension of agriculture.

By 1873, a report issued by MacKenzies and Cowan on Sauchie Coal Field must have inspired new manager Alexander Roxburgh to press the partners of Alloa Coal to invest more than the estimated £4000 necessary to resume operations at Devon.³⁹ In fact, despite the fact that at least one partner, Moubray, did not want to make a further investment beyond the £4621 already spent, £10,000 was designated for refitting and more was needed before the pit was operational.⁴⁰ Like his manager, Paton, twenty years before, Moubray's more conservative reasoning may have been either economic or environmental or some combination of both. Had he had his way, the landscape of the Devon Colliery would have remained in its twilight stage: not quite industrialized, but certainly no longer agricultural.

Alexander Roxburgh, on the other hand, representing the new guard and intent on creating a wholly-industrial, modern colliery had no such qualms, joining the wider Scottish trend which resulted in the coal mining bubble of the 1870's. He would have been lured by MacKenzie and Cowan's reports of 445,000 tons of "the most valuable kind of coal" available from the nine feet seam over an area of 120 acres, with the lower five feet seam providing 1, 195,000 tons of coal over a 430 acre area.⁴¹ MacKenzie and Cowan went on to note:

Were this Pit sunk to the lower five feet seam, and a cross cut mine driven northwards to meet the upper seams, and more powerful winding engines erected with a suitable arrangement of screens, tramways, and sidings, there would be no difficulty in raising therefrom, after the workings were sufficiently opened up, an average annual output of about 80,000 tons. Coal in the total quantity to maintain this output for 24 years.⁴²

³⁹ *Ibid*, p. 4.

⁴⁰ Carvel, *One Hundred Years in Coal*, p. 82.

⁴¹ National Archives of Scotland, Report by Mackenzies and Cowan on Sauchie Coal Field, CB24/143, 1871, p. 4.

⁴² *Ibid*.

For Roxburgh, the landscape changes previously described would have been a testament to progress, an opinion with which the *Alloa Advertiser* concurred, writing with a great deal of pride in 1882 that the new mine which "... promises to be one of the largest in Scotland has been laid out in a manner which reflects the greatest credit upon all concerned."⁴³ The implications of this investment for the environment were simply not considered by Roxburgh, putting him more in line with traditional industrialists of the times. The results of Roxburgh's decision making helped create a different kind of "space between" than existed under Bald, Paton and Wallace. Nevertheless, the site remained an edgeland, sufficient unto itself, complete with accommodation and transport, and in even greater contrast to the nearby romantic Ochils landscapes celebrated by native contemporaries than ever before.

With the opening of the Furnace Bank pit at Devon Colliery, Roxburgh had definitively established that profits were more important than environmental impact. The technical mining decisions to be made during his tenure until 1899 had serious implications for the degradation of the environment and its status as an edgeland. Roxburgh solicited the advice of no fewer than three mining engineers to help him determine whether or not mining under the River Devon was possible, and if so, which would be the proper technique: post and stall, or longwall mining. Unlike the more conservative decision made by Robert Bald to stick with post and stall mining at this particular site, David Landale, the first engineer consulted by Roxburgh, recommended longwall working of the coal under the river, otherwise he feared the weight of the pillars sinking into the pavement would cause subsidence.⁴⁴ Five years later, Landale's future partner, John Williamson, concurred with Landale, but transformed the technical question into one of economics, saying that the only

⁴³ 'Extensive Mining Operations at Devon'.

⁴⁴ National Archives of Scotland, David Landale, Opinion as to the proper size of pillars and barriers necessary for keeping up the River Devon and the lowlying land adjoining the Alva and Alloa coalfields, CB24/161, 16 January 1883.

way to decide which method to employ would be to “...make a trial of longwall, that a careful note be kept of all the cost for labour, timber, etc., also of the coal and dross produced so as to make a fair comparison between the cost of the two systems.”⁴⁵ Despite this report, however, the 1887 agreement made with James Johnstone of Alva concerning mining under his land on the north bank of the Devon still stipulated that “[W]orkings under the River Devon and in the field generally outwith the total extraction areas...to be by stoop and room method.”⁴⁶ Alloa coal recognized the possible negative economic implications of this decision, stating in the same agreement their intentions

...to continue the workings from Furnace Bank Pit and not to occupy any surface of Alva...for any surface occupied the Company will either pay agricultural value or relieve the landlord of farm tenant’s claims and for any such surface unrestored at the end of the Lease will pay 25 years purchase of the agricultural value as provided in the current Lease.⁴⁷

Given that this agreement was made the same year Williamson recommended a trial of longwall, it is unlikely that Alloa Coal would have had time carry out such a test before settling on continuing to use stall and pillar. Even though the lease implies that Alloa Coal might be cautious in their choice of mining techniques, they were making an economic rather than an environmental decision. They had no desire to compensate local landowners for subsidence damage.

By 1898, not even the possible negative economic consequences of mining under the river could save the Devon, despite the fact that a third mining engineer, David Rankin, sounded the most cautious but also most environmentally aware note concerning the best technique for mining under the Devon. He advised against “...the strata being broken by the working of the stoops...where there is less thickness than about 30 fathoms between the coal

⁴⁵ National Archives of Scotland, John Williamson, Best mode of working the upper five foot seam, CB24/150, 25 July 1887, p. 8.

⁴⁶ National Archives of Scotland, Carmichael and Miller to Bain, CB24/150, 9 September 1909.

⁴⁷ *Ibid.*

and the alluvial cover.”⁴⁸ Rankin went on to share his concerns about the proximity of the mine to the river, possible subsidence to the bed of the river and disruption to the flow of its water. His report did result in an extension of the 1887 agreement to use stoop and room mining under the river to 1909.⁴⁹ However, the following year, manager James Bain pushed for the 1910 renewal of the lease to read: “[S]urface lowered or permanently damaged underlying the total area of extraction *not* to be claimed for, nor any compensation paid to agricultural tenants for crops grown thereon.” Furthermore, the “company needs to undertake to keep the workings being operated on up to abandonment clear and in efficient order, but after that they are not liable for flooding.”⁵⁰ While the latest language most likely came about due to a very complicated land claim case involving a local farmer and Alloa Coal between 1906 and 1909,⁵¹ Bain's proposals were a direct about-face not only from the most recent lease in which Alloa coal was held fiscally responsible for surface damages, but also from the original 1835 lease which implied that Alloa Coal were required to restore ground even if it was not necessary for the future of the colliery.⁵² This change in language represented as great a turning point for the environmental quality of the site as did Roxburgh’s more visible infrastructure changes. James Bain and Alloa Coal were now making a clear statement about the supremacy of mining over the agricultural pursuits of their neighbours. The resulting degradation set their territory further apart from its surroundings and delineated it as a space in which they would have full latitude to pursue profits, regardless of the wider impact of their ambition on the landscape.

⁴⁸ National Archives of Scotland, David Rankin, Report relative to the mode which should be adopted in working the coals under the Haugh lands in the Estate of Alva, CB24/150, 24 August 1898, pp. 5-6.

⁴⁹ National Archives of Scotland, Carmichael and Miller to James Bain, CB24/150, 14 June 1906.

⁵⁰ National Archives of Scotland, Proposals to renew Alva lease, CB24/150, 1910-1931.

⁵¹ National Archives of Scotland, Carmichael and Miller to James Bain, CB24/150, 14 June 1906; Carmichael and Miller to Blain, 10 November 1909.

⁵² National Archives of Scotland, Alloa Colliery Lease, CB24/161, 1835.

Roxburgh, Bain, and Andrew Telfer, who took over in 1921 as the last of Alloa Coal Company's Devon Colliery managers⁵³ were not only faced with below-ground mining decisions. They were also responsible for taking action on above-ground infrastructure which included making some important pollution control decisions. Some of these decisions, such as Bain's decisions to further mechanize mining operations⁵⁴ and Telfer's decisions to electrify the Colliery and then make it self-generating, to improve the rail siding, or to open the brick works would have been fairly straightforward business decisions based primarily on the economic situation of the Company. Pollution control decisions, on the other hand, required weighing the environment with economics and Roxburgh, Bain and Telfer all demonstrated some ambivalence toward these issues which helped to set the site apart from its surroundings as an edgeland. The 1883 project to supply Fishcross with water from Johnstone's Alva estate was a curious mix of an environmental awareness that their water was not clean, reluctance to petition the burgh of Alva for public assistance in the matter, and a willingness to make a private deal and investment in order to solve the problem. Although this project must have been fairly costly, Alloa Coal apparently saw it as an investment that would help protect its interests from potential outside meddling, thereby further isolating their space and allowing it to maintain its edgeland status.

Inevitably, though, "outside meddling" finally came to Devon Colliery in 1926. James Bain's push for increased mechanization in the early twentieth century resulted in greater surface waste, dust, and dirtier coal, requiring Alloa Coal to invest in washing plants by 1913. By the mid-twenties Telfer had to further address the problem of pollution at the site. A report commissioned by the Scottish Board of Health in their attempt to address river pollution prevention noted that the washing plants had "...been altered and improved since" they had been installed by Bain, but went on to point out that as of 1926

⁵³ Carvel, *One Hundred Years in Coal*, pp. 94, 114.

⁵⁴ *Ibid*, p. 107.

Settling tanks of a kind have been provided but are completely silted up and useless. The area is too restricted and adequate settling tanks are required to deal with the washing water, wagon drip and general surface drainage. I was informed by the Colliery Manager that the County Medical Officer of Health and County Sanitary Inspector have had a meeting with the General Manager of the collieries and a promise has been given that the company will provide new settling tanks.⁵⁵

This was the first case in which outside officials obviously forced Alloa Coal's hand in their weighing of the importance of profits over the environment. A second report to the Scottish Board of Health dating from 1926 also implicated Alloa Coal in a question of sanitation at the miners' quarters closest to the Colliery. Unlike Alloa Coal's response to providing clean water at Fishcross, the examination into the need for a WC and cesspool at Howetown was initiated by the Scottish Board of Health. Eventually the WC but not the cesspool were provided. Unfortunately there is no record whether the provider was the Board of Health or Alloa Coal. The interesting thing to note here is that in 1883, the Company was willing to privately invest in a water supply project, but by 1926 they required official prodding, or even "allowed" the Board of Health to address the problem of sewage on their doorstep.

The fact that Alloa Coal were in business nearly a century before any external authority exerted their influence over their space demonstrates just how much an edgeland the site had become, impervious to burgeoning concerns in the adjacent villages over pollution and sanitation until public opinion turned against them.⁵⁶ From the 1880s, when the colliery became fully industrial through the turn of the century when James Bain refused to be held fiscally responsible for environmental damage, the Devon Colliery site was purposely managed as an edgeland in order to keep it separate and free from the concerns of its neighbours. By the 1920s, this style of management was in jeopardy as even its edgeland status could not protect the site from a growing public awareness of pollution and its

⁵⁵ National Archives of Scotland, Extract from Report by J. B. Hamilton, DD13/2662, 23 August 1926.

⁵⁶ Changes in public perceptions and responses to environmental damage are discussed in Chapters 3 and 4.

consequences for the environment. However, regulatory power held by either local, Scottish, or national authority was still too weak even by mid-century to have any demonstrable effect in controlling Alloa Coal's production on the site and the space remained an edgeland even into the subsequent period.⁵⁷

“Status quo” was apparently the watch word during the fourteen years that Devon Colliery was run by NCB following the war. The Coal Board was much more interested in developing its new mine at Glenochil, and in fact a memo from NCB in June of 1959 noted that “the main reason for delay in closing Devon Colliery was the delay in getting Glenochil up and running.”⁵⁸ During this period, the Coal Board was more concerned with the economic and environmental implications of managing the abandonment and eventually the rehabilitation of the site. As was previously noted, NCB went to some trouble to investigate the situation of scrap uplift two years after it closed the colliery. Other than a list of items that could have been scrapped, there does not seem to exist any formal agreement between NCB and Mr Kerr. The Coal Board itself noted in its audit the “[L]ack of clear agreement and documentation as to who was in general control of the process,” and “lack of documentation to the site custodian at Devon as to what material was involved.”⁵⁹ Yet who other than NCB was responsible for this mismanagement? In dealing with this situation, NCB was treating its own property as edgeland with its own managers turning a blind eye, or perhaps even benefiting personally by participating in some nefarious scrap dealing. Such socially unacceptable, quasi-illegal activity is just the thing that results from the lack of management that helps to define edgeland space.

⁵⁷ Regulation of environmental damage by coal mining is discussed in Chapter 4.

⁵⁸ National Archives of Scotland, Milligan Memo, CB276/14/1, 17 June 1959.

⁵⁹ National Archives of Scotland, National Coal Board Scottish Division: Internal Audit Branch, Alloa area: Enquiry into the control of uplifting of scrap from Devon Stores Compound by a scrap merchange between 6th and 10th September 1962, CB276/24/1.

More financially significant, though involving less intrigue than tales of scrap uptake, were issues of working mine pollution as well as abandoned mine mitigation in Clackmannanshire first confronting NCB in the early 1970's. The Devon Angling Association, who had been managing the river on an informal basis since 1905⁶⁰ were the first local group to pressure NCB to manage pollution from their mines. According to the Devon Angling Association, "coal washings completely obscured the river bottom in about one foot of water" at Dollar in 1971.⁶¹ A year later, the secretary of the Association noted that as the

NCB were to spend 6 million pounds on restoration of the environment in certain mining districts by the removal and disposal of the pit bings...the Secretary suggested that an approach should be made to the Coal Board to consider under this same operation the cleaning up of the River Devon from Dollar downwards where their effluents had brought the river to a disgraceful state.⁶²

The anglers reported the matter to the River Purification Board, who referred it to the Coal Board Scientist, Mr Dyce. However, the closing of the Dollar Mine the following year seemed to resolve the situation for the association. At their annual meeting in November of 1973, the secretary for the Angling Association reported that once the mine closed in June "...a great improvement in the discharge from the burn had...become apparent."⁶³ Despite this good news, the Coal Board must have been aware that there would be other uses found for the six million pounds they had apparently earmarked for restoration, motivating them to pawn their property off on someone else to take responsibility for its rehabilitation. In March 1973, William Summers of the Coal Board wrote to the Scottish Development Department that the site of the former Devon Colliery "...is presently the subject of rehabilitation development discussions between the Board and the County Council of Clackmannan, and in

⁶⁰ Devon Angling Association, <http://www.devonangling.btck.co.uk/About%20us>. [Accessed 7 December 2012].

⁶¹ Devon Angling Association Archives, Annual General Meeting minutes, 15 November 1971.

⁶² *Ibid*, 11 December 1972.

⁶³ *Ibid*, 22 November 1973.

due course ownership will probably pass to the County Council.”⁶⁴ The Coal Board had no financial interest in cleaning up what it no longer needed, though notably they did not try to argue that mitigation was not necessary. It simply passed that responsibility on to the local authority, who clearly weighed the environment in favour of economics, willing as they were to purchase land of questionable value.

Fortunately for the finances of the Coal Board, the passage of the Town and Country Planning (Scotland) Act 1975 meant that they no longer needed to take responsibility for their mess. The local authority could now take action to mitigate derelict land, even if it was not yet under their ownership. The Planning Act established the Scottish Development Agency (SDA) who were charged with controlling and financing the clearance of derelict land.⁶⁵ In their 1976 Regional Industrial Development Strategy report, the Central Regional Council (CRC) proposed rehabilitation of the Devon Colliery site. The SDA suggested appointing the CRC as their agents for the scheme,⁶⁶ along with providing a grant covering 100% of the costs.⁶⁷ According to SDA estimates, £10,000 was needed to acquire the land from NCB and £140,000 for the rehabilitation itself,⁶⁸ while selling the site’s slurry to the South of Scotland Electric Board saved approximately £30,000.⁶⁹ In its acceptance of the former colliery as one of the six sites for which the CRC was approved to act as SDA’s agent, SDA warned: “[I]t must however, be borne in mind that acquisition plays an important part in the clearance of

⁶⁴ National Archives of Scotland, William Summers, NCB to Miss McGrory of the Scottish Development Department, DD27/5114, 28 March 1973.

⁶⁵ Stirling Council Archives, Central Regional Council, Department of Planning and Development, Report to Planning and Development Committee, Scottish Development Agency Rehabilitation Programme, 13 January 1976.

⁶⁶ Stirling Council Archives, Central Regional Council, Department of Planning and Development, Letter from SDA to CRC, 9 February 1976.

⁶⁷ Stirling Council Archives, Central Regional Council, Department of Planning and Development, CRC Report to Planning and Development Committee, Scottish Development Agency Rehabilitation Programme—Progress Report, 14 September 1976.

⁶⁸ Stirling Council Archives, Central Regional Council, Department of Planning and Development, Report to Planning and Development Committee, Scottish Development Agency Rehabilitation Programme, 13 January 1976.

⁶⁹ ‘SDA Sanction Heritage Plans’, *The Scotsman*, 1 December 1976.

derelict land programme...⁷⁰ Most likely SDA was concerned that the CRC would not have the necessary motivation to clean up land that did not actually belong to it. However, the willingness by SDA to fund and by the CRC to participate in a project that would measurably improve the environment without necessarily resulting in positive economic consequences demonstrates an intriguing attitude toward the site of the former colliery as an edgeland. Other sites designated for SDA rehabilitation funding, such as the Nobel Explosives Factory in Redding or the Summerford Works in Falkirk had “potential after-use value,”⁷¹ but the Devon Colliery was unique in its existence as a space intended only for rehabilitation. Even though rehabilitation clearly meant that a “human hand” would green the space, doing so without then further managing the space would allow it to preserve its legacy as an edgeland.

In May of 1977, the SDA formally accepted the CRC’s three year rehabilitation programme which included the Devon Colliery site. The budgeted cost was £20,000 for acquisition of the site and £200,000 for its rehabilitation.⁷² However, after this date until 1979,⁷³ no further mention was made of acquisition other than a brief note in October 1977 stating that the item related to “National Coal Board, land acquisitions” was “deleted from the agenda to allow Management team more time to discuss the proposals in more detail and report back to the committee.”⁷⁴ Instead, between July and October of that year, SDA accepted two wildly divergent bids for the rehabilitation work: one from Nicholas Dysart in July for £2703.75, who underbid the next lowest competitor, I. and H. Brown of Perth by

⁷⁰ Stirling Council Archives, Central Regional Council, Department of Planning and Development, Report to Planning and Development Committee, Scottish Development Agency Rehabilitation Programme, 13 January 1976.

⁷¹ Stirling Council Archives, Central Regional Council, Department of Planning and Development, CRC Report to Planning and Development Committee, Scottish Development Agency Rehabilitation Programme, 13 January 1976.

⁷² Stirling Council Archives, Central Regional Council, Department of Planning and Development, CRC Reports to Planning and Development Committee, 24 May 1977.

⁷³ Stirling Council Archives, Central Regional Council, Land and Buildings Committee, CRC Acquisition of Land and Property, LB 7, CR1/1/10, 19 April 1979.

⁷⁴ Stirling Council Archives, Central Regional Council, Department of Planning and Development, Rehabilitation of Derelict Land Progress Report on Schemes, PD109, CR1/1/6, 25 October 1977.

£65,969.⁷⁵ A second bid in October came from Bill Hendry Ltd., of Coatbridge for £413,241.⁷⁶ None of these figures are even in the ballpark of the estimated £200,000 for site mitigation. Even if some bids, such as the Dysart tender, represented just a fraction of the work, one is led to question the management of the project. As if these crooked numbers were not enough, NCB made out like bandits in their sale of Devon Colliery to the CRC, receiving £112,750, or more than five times the highest amount estimated for acquisition.⁷⁷ Again, the fact that the CRC was willing to pay so much more than the amount budgeted for the purchase of a site which did not have any immediate economic value proves their commitment to creating a more environmentally sustainable area, along with the unintentional consequence of preserving an edgeland. The traditional conceptualization of edgelands management involves questions of how to manage without managing. The CRC inadvertently answered this question by making the space safe without then assigning it another use.

In addition to weighing economic and environmental concerns relating to mitigating the land, the various levels of management involved in planning its redevelopment were also concerned with preserving the industrial legacy of the beam engine house, one of only two such structures surviving in Scotland. In 1973, while still under NCB ownership, the Scottish Development Department designated the building as a scheduled ancient monument.⁷⁸ While the CRC intended their mitigation efforts "...to return the major part of the area, 100 acres, to agriculture and woodland," the CDC also suggested that "[A]t some later date the reclaimed areas to the south and south-west of the Beam Engine House could perhaps be developed as a

⁷⁵ Stirling Council Archives, Central Regional Council, Department of Planning and Development, Summerford work/Devon colliery phase 1-results of tendering, PD64, CR1/1/6, 5 July 1977.

⁷⁶ Stirling Council Archives, Central Regional Council, Department of Planning and Development, CRC Reports to Planning and Development Committee, Rehabilitation of Derelict Land Progress Report on Schemes, 25 October 1977.

⁷⁷ Stirling Council Archives, Central Regional Council, Land and Buildings Committee, CRC Acquisition of Land and Property, LB 7, CR1/1/10, 19 April 1979.

⁷⁸ National Archives of Scotland, Certificate making the beam house an ancient monument, DD27/5114, 20 July 1973.

small industrial museum and recreation area.”⁷⁹ According to Mr Webster, chief assistant director of planning for the CRC, the “real problem” for the area including the beam house in the late 1970s was vandalism, and his first goal was “...to keep the structure safe and vandal-proof whilst keeping it accessible to the public.”⁸⁰ Mr Webster got his wish; by 1980 a tender of £15,901.08 for restoration of the beam engine house was accepted by SDA,⁸¹ though a year later he was still looking for more funding.⁸² Sadly, it was to be ten more years before suitable funding for the beam house project was acquired through the Department of Development and Planning’s allocation of “...£50,000 for a heritage fund for schemes involving the improvement of the historic environment and which would make a significant contribution to the promotion of the Region’s cultural heritage.” By 1992, the CDC had acquired the site from the CRC and had begun restoration of the beam house for public use.⁸³ Signs that attitudes toward preserving the industrial legacy not only of Clackmannanshire but also of Britain and even Europe were changing was apparent in the fact that the CRC thought that the Devon Colliery site could also “attract funding” from the European Regional Development Fund.⁸⁴ In attempting to refurbish the beam house and prevent illegal activities at the site, the CRC was recognizing some of the issues that result from edgeland status. In order to deal with these issues, not only the local authority but also international bodies were apparently willing to make an economic investment in order to manage the space for more purposeful activity. The consequence of this desire to simultaneously preserve while transforming represented yet another version of the edgelands management paradox. Local,

⁷⁹ Stirling Council Archives, Central Regional Council, Department of Planning and Development, CRC Reports to Planning and Development, Rehabilitation of Derelict Land Current Situation and Future Programme, 12 April 1977.

⁸⁰ National Archives of Scotland, I. Webster, CRC to I. Maxwell, SDD, DD27/5114, 16 January 1979.

⁸¹ Stirling Council Archives, Central Regional Council, Department of Planning and Development, Report of tenders accepted by SDA, PD271, CR1/1/10, 3 March 1980.

⁸² Stirling Council Archives, Central Regional Council, Department of Planning and Development, PD242, CR1/1/14, 5 November 1981.

⁸³ Clackmannan (Scotland) District Council, *Annual Report and Accounts 1992-1993*, (Alloa, 1994).

⁸⁴ Stirling Council Archives, Central Regional Council, Planning and Economic Development Committee, Heritage fund: application for financial assistance 1992/93, PE9, CR1/1/35, 27 April 1992.

national and even international interest in preserving industrial legacy should on the one hand be lauded, but on the other, these new layers of management could spell the end to the site's edgeland status.

Between 1979, when the CRC purchased the former Devon Colliery site from NCB and 1992, when they handed the land over to the CDC, the land was let for grazing. The CRC received approximately £3000 per year through these leases to various members of the community,⁸⁵ though by 1983 the land was let solely to Robert Marshall who apparently talked the Council down and ultimately paid them only £1000 pounds per year for all five fields from 1986.⁸⁶ In due character for an edgeland, in 1984 the Council Estates Manager reported he had "received correspondence from lawyers" that their tenant, Robert Marshall, had broken his lease by subletting to James Murray.⁸⁷ The estates manager recommended advertising for a new tenant,⁸⁸ but Marshall continued to be the sole tenant through 1989 on the same terms established in 1986.⁸⁹ Such a story exemplifies typical edgelands behaviour and as such, reinforces the idea that the CRC actually encouraged, if unintentionally, the maintenance of the former colliery as an edgeland. The CRC was apparently not very concerned about its management of the site once mitigated; they were certainly not profiting hugely from their mitigation efforts and seemed content with letting the space exist as an edgeland.

Another story telling of classic edgeland behaviour brought about by its management is that of a Mr J. W. Sharp, contractor of Alloa, who in January of 1984 applied to the CDC

⁸⁵ Stirling Council Archives, Central Regional Council, Land and Buildings Committee, Report by Estate Manager, LB113, 20 September 1979; LB124, 18 September 1980; LB242 22 January 1981; LB58, 28 May 1981; LB111, 13 May-1 September 1983.

⁸⁶ Stirling Council Archives, Central Regional Council, Land and Buildings Committee, Devon Colliery Tenancy Agreements, LB111, 1 September 1983; LB98, 30 August 1984; Leasing of land and buildings under delegated powers 1986, 23 June 1986.

⁸⁷ Stirling Council Archives, Central Regional Council, Land and Buildings Committee, Devon Colliery Tenancy Agreements, LB98, 30 August 1984.

⁸⁸ *Ibid.*

⁸⁹ Stirling Council Archives, Central Regional Council, Land and Buildings Committee, Devon Colliery Tenancy Agreements, LB111, 1 September 1983; LB98, 30 August 1984; Leasing of land and buildings under delegated powers 1986, 23 June 1986.

“...for outline planning permission to change the use of the ground” at the former Colliery site.⁹⁰ The land and buildings committee “[R]ecommended to advise Sharp that his application was premature,”⁹¹ yet a few months later, the CRC’s planning and development committee received his outline “...for creation of a heavy horse centre in an area of one acre within the rehabbed site.”⁹² One can only imagine Mr Sharp attempting to buttonhole various council and committee members to gain support for his project, perhaps trying to persuade them that it was in both the Council’s as well as his personal interest to transform the site according to his plan. Whichever way Mr Sharp spun his proposal: as an appropriate and sustainable use of the land, or to benefit either or both him and the Council financially, it, like the beam engine house proposals just prior to this time, had the consequence of forcing the issue of whether or not to manage the space as an edgelands, or to assign it a new purpose.

As a result of Mr Sharp’s proposal, a good deal of back-and-forthing went on between the CRC and the CDC as to which statutory body and regional authority was responsible for taking action on plans for the former colliery site.⁹³ By June both bodies were in agreement not to accept Sharp’s proposals as they were “not based on proper financial appraisals.” Rather, the CRC determined it would advertise for proposals from the public for using 8.5 hectares of the land for tourism or recreational purposes while maintaining the rest of the space for agricultural use.⁹⁴ For Mr Sharp, however, the story was not over. A year later, probably after learning of the CRC’s approval of the British Horse Society’s proposal for a cross-country horse course,⁹⁵ Mr Sharp, likely feeling rather sour-grapes that his proposal

⁹⁰ Stirling Council Archives, Central Regional Council, Land and Buildings Committee, Devon Colliery Tenancy Agreements, LB258, CR1/1/18, 5 January 1984.

⁹¹ *Ibid.*

⁹² Stirling Council Archives, Central Regional Council, Department of Planning and Development, Rehabilitation of Derelict Land—Devon Colliery, Fishcross, PD23, CR1/1/20, 8 May 1984.

⁹³ *Ibid.*

⁹⁴ Stirling Council Archives, Central Regional Council, Department of Planning and Development, Devon Colliery, Fishcross—Report, PD37, CR1/1/20, 18 June 1984.

⁹⁵ Stirling Council Archives, Central Regional Council, Land and Buildings Committee, Devon Colliery Rehabilitation Site—Proposed Cross-Country Horse Course—British Horse Society—Report of Interest by British Horse Society, LB9, CR1/1/22, 9 May 1985.

was passed over for a similar proposal, made an official complaint against the CRC and the CDC claiming “maladministration.”⁹⁶ He was to receive no satisfaction, however. The Commissioner for Local Administration in Scotland chose not to further investigate his claim.⁹⁷ Even in the midst of its transition away from an edgeland, confusion over who was responsible for the management of the land as well as indecision as to appropriate goals for its use are familiar problems that define a traditional edgeland.

The story of the foiled Mr Sharp did at least force the two Councils to attempt to straighten out their arrangements concerning the management of the former Colliery site. In 1984, the joint liaison committee between the CDC and the CRC recommended that 8.5 hectares of the site should be transferred to the CDC at a nominal charge for tourism, leisure, and recreation purposes, with the promise that the CDC would receive the rest of the land if its efforts to develop the 8.5 hectares for recreation were successful.⁹⁸ Approval for the equestrian centre still came from the CRC, albeit with the CDC’s full support.⁹⁹ It wasn’t until 1988, though, that the horse society agreement and the land were finally transferred to CDC,¹⁰⁰ who invested £236,000 of capital expenditure in the development of the centre.¹⁰¹ For the first time since NCB operated the colliery, a decision about the use of the space was made based on its financial possibilities. This, along with the fact that the beam engine house was also being repurposed at this time, meant that the site was no longer being managed as an edgeland.

⁹⁶ Stirling Council Archives, Central Regional Council, Land and Buildings Committee, Devon Colliery Rehab—Commissioner for Local Administration in Scotland, LB143, CR1/1/22, 12 November 1985.

⁹⁷ *Ibid.*

⁹⁸ Stirling Council Archives, Central Regional Council, Planning and Development Committee, Devon Colliery, Fishcross—Report re: Possible future uses of site, PD37, CR1/1/20, 18 June 1984.

⁹⁹ Stirling Council Archives, Central Regional Council, Land and Buildings Committee, Devon Colliery Rehabilitation Site—Proposed Cross-Country Horse Course—British Horse Society—Report of Interest by British Horse Society, LB9, CR1/1/22, 9 May 1985.

¹⁰⁰ Stirling Council Archives, Central Regional Council, Land and Buildings Committee, Devon Colliery Rehab Site—Proposed sub-national equestrian Centre, LB256, CR1/1/26, 25 February 1988.

¹⁰¹ Clackmannan (Scotland) District Council, *Annual Report and Accounts 1992-1993*, (Alloa, 1994), p. 39.

The Devon Equestrian Centre operated between 1992 and 2006 without apparent incident; in fact it was “held up as a showpiece for the district...and [was] a very popular venue for events.”¹⁰² Lacking any further tales of a vaguely shady nature, for these fourteen years the site of the former Devon Colliery seemed at last transformed into a space legitimized by public acknowledgement. However, in 2006, the CDC decided to give approval to lease the centre for ten years to new tenants “to invest capital in the Centre to grow and develop the facilities in the district.”¹⁰³ At the time of the search for new tenants, the centre cost the CDC £30,000 per year, while receiving £12,000 in rent. Significantly, however, the CDC was interested in tenants who would not only invest £200,000 in the centre, but who would use that investment to “protect the character of the landscape for the community,” and “[M]ake the most of Clackmannanshire’s unique built and natural environment.”¹⁰⁴ Whether or not further development of an equestrian centre at the site of a former coal mine was “protecting the character of the landscape” is debateable, but the CDC was certainly to be lauded for noting the uniqueness of the space as well as for its interest in preserving it. Again, the edgeland management paradox reared its head: the “peculiarity” of the space was due to its edgeland status, the intersection between its “unique built and natural environment.” However, if the CDC sought to protect that status, the space would no longer be so singular.

Bidders for the new lease seemed to express some ambivalence about the space. The highest bidder, operators of a riding centre at Kilsyth, withdrew their offer and the Council had to accept the second highest bidder who, at £9350, was offering only slightly less than

¹⁰² Gordon Stewart, Lease of Devon Equestrian Centre, Fishcross, Clackmannan Council, 7 December 2006, p. 1.
<http://www.clacksweb.org.uk/council/reports/?title=equestrian+centre&author=&bodyid=&catid=&fromm=&fromy=&tom=&toy=&so=category&sub=1>. [Accessed 10 April 2014].

¹⁰³ *Ibid*, pp. 1-2.

¹⁰⁴ *Ibid*, p. 2

the Kilsyth bidder.¹⁰⁵ A third bidder, a neighbour of the Centre, offered just half of the highest bid.¹⁰⁶ While it would seem to be a matter of routine business for the lowest bidder to lose out, in this particular instance, the lowest bidder was to come back to haunt the Council just two years later when the Council was forced to have the Centre audited. The audit reported poor financial performance. The tenant had not paid rent for six months, nor had they made any attempts at investing any of the £100,000 they had promised over five years for capital development and in actuality had to propose subletting the land for grazing. Furthermore, the landowner adjacent to the Centre decided to take his revenge for losing the bid by harassing the Centre's manager to the extent that he was forced to take stress leave.¹⁰⁷ Yet again, despite the CDC's best efforts, strange tales of malfeasance and irregular, quasi-illegal behaviours continued to simmer; not enough to become a scandalous public issue that could be definitively resolved, but just enough for the site to maintain its ambiguous nature.

In its approval for the Scottish Society for the Prevention of Cruelty to Animals (SSPCA) to take over the site from the defunct Devon Equestrian Centre for its wildlife rescue centre in 2010, the CDC continued the trend it established four years earlier by seeming to orient its decision more toward sustainable development and preservation of the site's character rather than toward financial considerations. In their report on SSPCA's planning application, the CDC specifically noted that the reasons for their decision in favour of SSPCA were that the proposal "involves redevelopment of vacant and underused brownfield land for a purpose that requires a countryside location."¹⁰⁸ According to Historic

¹⁰⁵ Gordon Stewart, Lease of the Devon Equestrian Centre, Fishcross, Alloa, Clackmannanshire Council, 27 September 2007, p. 1.

¹⁰⁶ *Ibid.*

<http://www.clacksweb.org.uk/council/reports/?title=equestrian+centre&author=&bodyid=&catid=&fromm=&fromy=&tom=&toy=&so=category&sub=1>. [Accessed 10 April 2014].

¹⁰⁷ Muir Wilson, Devon Equestrian Centre-Report by External Audit, Clackmannanshire Council, 24 September 2009, pp. 9-10.

<http://www.clacksweb.org.uk/council/reports/?title=equestrian+centre&author=&bodyid=&catid=&fromm=&fromy=&tom=&toy=&so=category&sub=1>. [Accessed 10 April 2014].

¹⁰⁸ Keith Johnstone, Report of handling on planning application-Demolition of existing Devon Equestrian Centre Building and construction of SSPCA National Wildlife Centre with 2 houses for management

Scotland, SSPCA's activities "would not adversely affect the setting of the Beam House or the character of the area." Finally the CDC concluded that the project "...would provide sustainable development and enhance the status of Clackmannanshire as a place for Green Business."¹⁰⁹ The CDC would have gone to considerable trouble and likely some expense to install SSPCA at the colliery site. Their report provides a detailed list of environmental investigations and risk assessments that were necessary to carry out due to fears of ground gas and ground water risks to "major receptors;" presumably the animals that would be housed on the site,¹¹⁰ to say nothing of the possible negative consequences for the CDC had the assessments turned up any evidence of pollution on the site. In other words, the CDC took a bit of an economic gamble by choosing to consider the environmental and historical qualities of the site and encouraging the application of the SSPCA. Ironically, it was a risk that has actually paid off in terms of the management of the legacy of the site as an edgeland. Injured wildlife cannot survive on their own in the true "wild," hence their rescue by the SSPCA, yet an urban setting for a wildlife centre is a contradiction in terms. While the CDC referred to the area as "the countryside," rather than "edgeland," they were most certainly correct in their assessment that the purpose of the SSPCA centre was "compatible with the...location,"¹¹¹ a location neither urban or nor rural, off the beaten path, yet still accessible, and managed with the idea that preserving this in-betweenness was in the best interests of the tenants as well as the wider community. In granting the SSPCA their tenancy, the CDC pulled off an edgeland management coup. As will be shown in chapter three, their management addressed two centuries of environmental change and degradation without sacrificing the site's edgeland status.

accommodation at Equestrian Centre, Fishcross, Planning Committee, 2 September 2010, p. 24. <http://www.clacksweb.org.uk/council/reports/?title=equestrian+centre&author=&bodyid=&catid=&fromm=&fromy=&tom=&toy=&so=category&sub=1>. [Accessed 10 April 2014].

¹⁰⁹ *Ibid*, pp. 25-27.

¹¹⁰ *Ibid*, p. 1.

¹¹¹ *Ibid*, p. 30.

Chapter III

Fire, Water and Earth

One of the traditional depictions of an edgeland is of a wasteland: derelict, degraded, possibly contaminated. Throughout the first two hundred year life of the Devon Colliery edgeland, changes in its environmental quality correlated closely with this stereotypical image of an edgeland. Between 1792 and 1835, struggles between man and fire resulted in visible, physical change in the landscape which made the creation of an edgelands inevitable. By the following period, 1835 to 1880, physical change became more synonymous with physical damage via water and water-related subsidence. The disconnect between what was happening out-of-sight below ground with above-ground environmental deterioration helped further the edgelands phenomenon at the site. The greater focus on profit beginning most notably with the 1880 expansion of the colliery naturally created greater amounts of pollution and contamination while simultaneously making it easier to disregard the degradation. The acceptance of these changes in environmental quality as part of the natural order of industrial progress was the most definitive in perpetuating the Devon Colliery as a classic edgeland through the mid twentieth century. By the late twentieth century, however, the local authorities responsible for the former Devon Colliery managed to both mitigate the site as well as maintain its edgeland legacy. The results of their rehabilitation efforts as evidenced by chemical analysis of current concentrations of heavy metals in the site's soil help support the idea that edgelands do not have to be contaminated or polluted in order to remain edgelands.

In 1830, news of threats to the environment in the Clackmannanshire coalfields travelled all the way across the Atlantic. *The American Journal of Science and Arts* reported:

It has been two years since the snow lying on the field on the farm of Shaw Park, belonging to the Earl of Mansfield

was observed to melt almost as soon as it fell, and then rise into a state of vapour. The phenomenon attracted the attention of the managers of the Avon and Devon collieries, and was found to be the effect of the heat produced by a stratum of coal in a state of ignition, technically known by the name of the nine feet seam, from which the Devon Iron Works are supplied with a large proportion of their fuel.¹

The fire "...raged for about 30 years over an area of twenty six acres," threatening not only the destruction of the entire coalfield, causing subsidence and "laying bare the burning waste and discharging smoke and steam."² As is evidenced by the fact that news of the Sauchie fire was international in scope, concerns over environmental deterioration resulting from coal mining even at this early date were not exclusive to Clackmannanshire. Baron Duckham noted that throughout Scotland, "[M]ining itself was a venture that...slowly but inexorably despoiled...estates" and there was indication that by 1835, some landlords had become unhappy "with the extent of mining on their properties."³ During this period, the changes in environmental quality which landlords were apparently responding to were visible, physical transformations of the landscape. The Devon Colliery and Iron Works and their immediate neighbourhood were not yet derelict or contaminated, nor could they be described as wasteland as contemporary edgelands often are. However, the physical changes in the quality of this environment that helped to set dereliction and contamination in motion had begun by the early nineteenth century. As good a steward as he wished to be to the lands which held his mines, the efforts by Bald and his colleagues at the Avon and Sauchie collieries to fight these changes only made more inevitable the creation of an edgeland.

¹'Burning Coal Mine at New Sauchie', *The American Journal of Science and Arts*, 18 (1830), p. 386. (accessed online).

² Edward Cayley, 'Burning Waste of Clackmannan', *The Living Age*, 30 (1851), p. 32. (accessed online).

³ Baron F. Duckham, *A History of the Scottish Coal Industry, Volume 1: 1700-1815, A Social and Industrial History* (Newton Abbot, 1970). pp. 168-169.

The Sauchie fire was blamed on the illicit distilling of whisky in the pit,⁴ classic surreptitious edgeland behaviour. Less fanciful is the idea that the investment into the fighting of the fire, while economically motivated, also had the unintentional consequence of environmental change. The purpose of fighting the fire was to prevent it from spreading into the lower wastes and burning the seams connected to Devon Colliery, thereby saving not only hundreds of thousands of tons of coal, but thousands of pounds as well. The clay puddle wall built to surround the fire took five years to build and cost £16,000.⁵ Even so, keeping the fire in check cost the Earl of Mansfield £200 per year for the next two decades with little hope that it could ever be fully extinguished.⁶ Had no effort to contain the fire been made, however, the entire coalfield could have become a wasteland with little hope of it ever having any further agricultural or environmental value. The resulting environmental change from the struggle between human effort and nature were inconclusive and began to create in the Devon Colliery neighbourhood a sense of dislocation⁷ characteristic of edgelands.

Fire continued to be an issue when Alloa Coal Company took control over Devon Colliery and its neighbouring mines. Their 1849 lease with the Earl of Mansfield for his Sauchie Collieries noted that Alloa Coal was "...not responsible for any loss or damage that may arise from the spreading of fire already existing in the Sauchie coal-field."⁸ Around the same time, "...accumulation of mine rubbish" at a pit used by Devon Iron "caught fire and burned for some months."⁹ However, during this period, water, rather than fire, was the primary environmental concern at the Devon Colliery and Iron Works. The 1837 agreement

⁴ Cayley, 'Burning Waste of Clackmannan', p. 32.

⁵ *Ibid.*

⁶ *Ibid.*

⁷ Lewis Mumford, quoted in Gavin Bridge, 'Contested Terrain: Mining and the Environment', *Annual Review of Environment and Resources*, (29) 2004, p. 241n.

⁸ National Archives of Scotland, Alloa Coal Company lease with the Earl of Mansfield, CB24/161, 1849, p. 21.

⁹ John Lees Carvel, *One Hundred Years in Coal, the History of the Alloa Coal Company* (Edinburgh, 1944), p. 36.

between Alloa Coal and the Iron Works made pumping the water in the workings at North Sauchie into the nine feet waste a prerequisite for working the coal there.¹⁰ The subtrack from the following year made similar specifications for pumping water; in this case from the five feet seam to the surface.¹¹ Unlike management's response to fire prior to Alloa Coal's take-over of the leases, the results of the response to the water issues created not only environmental change, but environmental damage. Further physical changes to the landscape brought about by water and subsidence created an early wasteland so often synonymous with the concept of an edgeland. While the contemporary notion of a wasteland is a space which is "wasted" for further purpose, the "wasteland" at the Devon Colliery and Iron Works was wasted in that, with its environmental deterioration, over the next forty-five years it gradually passed the point where the site could be used for any purpose other than mining and smelting.

A significant court case between Robert Bald's trustees and Alloa Coal involving water damage and subsequent subsidence heard in 1854 could point to the main reason the coal company shut down Devon Colliery in that year, even though the case involved the nearby Holton Pit. As defendants, Robert Bald's family argued that the water which Alloa Coal pumped out of the nine feet seam at Holton in order to obtain the coals left behind in the pillars¹² resulted in damage to the house they leased from the Erskine family, including "...various sits or crushes in and around his Mansion House and Garden that the walls of both have been rent and cracked from the foundations."¹³ The jury ruled that "it was obvious that injury to the pursuers property would follow from withdrawing the water" and that "injury might have been prevented had precautions been taken." Alloa Coal was held responsible for

¹⁰ National Archives of Scotland, Agreement between Alloa Coal and Devon Iron Works, CB24/150, 1837.

¹¹ National Archives of Scotland, Subtrack Devon Iron Works to Alloa Coal Company, CB24/150, 1838.

¹² National Archives of Scotland, Verdict by the jury in Bald's Trustees V The Alloa Coal Company and the Earl of Mar, CB24/111, 2 January 1854.

¹³ National Archives of Scotland, William Wotherspoon to Lord Mar, CB24/111, 16 April 1849.

damages worth £1350.¹⁴ This case was a clear example of land damage resulting from mining. No longer was the Devon Colliery site simply changing. Activities there were having deleterious effects throughout the neighbourhood, rendering it, in the words of the Balds' lawyer, "now just next to uninhabitable."¹⁵

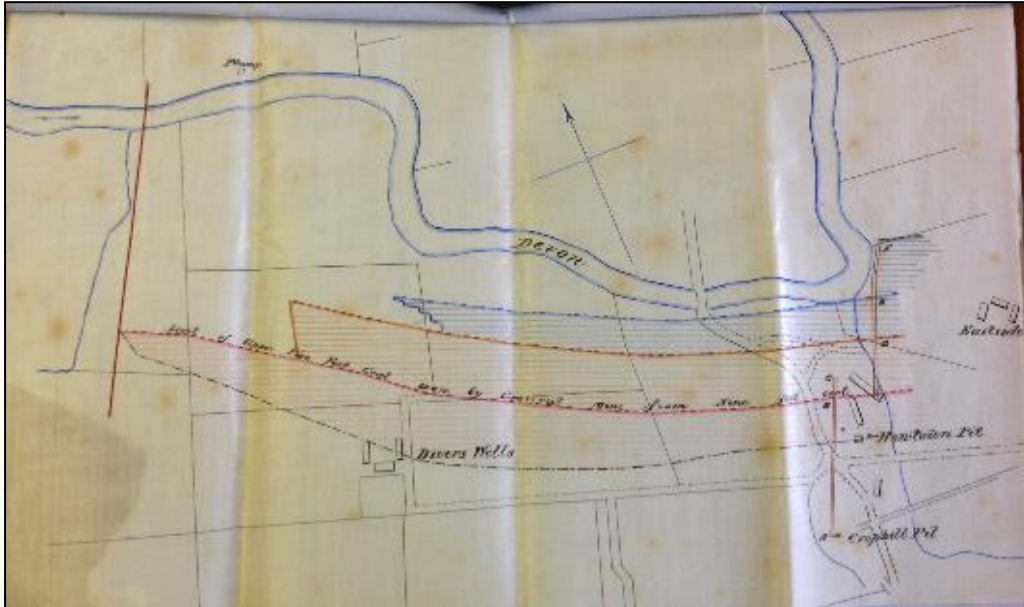


Fig. 11 Diagram showing surface plump on James Johnstone's property¹⁶

Despite its continued closure during the 1860's, the significance of the River Devon to mining operations at the Colliery became yet another water-related environmental concern for Alloa Coal Company. A plump, or subsidence, had opened up on James Johnstone's Alva property on the north side of the river in 1863 (see fig. 11) which he claimed was due to operations at Devon Colliery. Hired by Alloa Coal to investigate, John Williamson's engineer's report revealed that:

The plump is situated...12 yards from the River Devon. It is right under the artificial bank constructed for damming back the river water in time of flood. Its dimensions are

¹⁴ National Archives of Scotland, Verdict by the jury in Bald's Trustees V The Alloa Coal Company and the Earl of Mar, CB24/111, 2 January 1854.

¹⁵ National Archives of Scotland, William Wotherspoon to Lord Mar, CB24/111, 16 April 1849.

¹⁶ National Archives of Scotland, John R. Williamson, Mining engineer, Report of surface plump on Alva Property, CB24/143, 1863.

18 feet long east and west by 16 feet north and south. It is six feet deep in centre, of which three feet is standing water. A drain pipe leading to the Devon of some five or six inches in diameter, about two feet below the surface can be seen on both sides of the hole, in the centre of it. The soil is running sand. The bank has subsided into the hole.¹⁷

Once again, physical landscape change caused by water damage was resulting in environmental degradation, making the land useless for agricultural purposes. However, Williamson refused to acknowledge the possibility that such degradation could have been caused by mining. He concluded:

It certainly requires a rather strong stretch of the imagination to conceive that so strong workings with such a roof, at such a depth and filled with water could have been the occasion of such a hole as we have attempted to describe. It is only where workings are carried on till they crop into sand or clay, like Mr Johnstone's at Glenfoot, that such things can occur, certainly never in circumstances like those under consideration.¹⁸

William Paton, manager of Devon Colliery at the time believed that the "...drain running through it was dammed back by the Devon floods and had gotten choked up and the water in forcing its way out, as the Devon subsided had carried with it a portion of the running sand, until it formed a cavity below the ground..."¹⁹ Whichever was to blame for the pump, man and his mines, or nature and her floods, the fact that the issue was investigated and documented proves that, by mid-century, anthropogenic activity was resulting in wasted land.

Regardless of whether or not a mine 170 yards away from the bank of the river could create a plump on the opposite bank, by 1865 Alloa Coal had begun to investigate the possibilities of underbuilding the River Devon. This act which would have put them definitively under Johnstone's property.²⁰ In addition to the 170 yards from the place of the

¹⁷ *Ibid*, p. 2.

¹⁸ *Ibid*, p. 9.

¹⁹ *Ibid*, p. 10.

²⁰ National Archives of Scotland, David Landale, Specification for underbuilding the River Devon in the Cobblecrook old encroachment in the five foot lower seam at Collyland, CB24/143, June 1865, p. 2.

current shaft to the river, the mine would extend another 60 feet under the breadth of the river. Mining engineer David Landale warned that “[T]he River in floods overflows its banks and this circumstance you will require to take into consideration.”²¹ He showed further concern for the power of the River Devon over man’s attempts to master it by proposing “...to get the material for the underbuilding, from the waste at parts distant from the River”²² rather than wreaking any further havoc with the river banks apart from the apparent economic necessity of reaching the coal that lay there. As in the case of the Sauchie fire, even below ground, the results of the human/nature struggle were inconclusive. Although they were out of sight, they had the potential to create above-ground physical environmental damage. The above ground consequences of hidden, below ground activity must have been quite dislocating, thus lending the site its ambiguous edgeland characteristics.

An 1875 court case brought by James Blair against Alloa Coal for damage to his farm land points to further evidence of land damage caused by mining. The court ruled “...that respondents have no right to drive any mines, &c., through the petitioner’s lands for the purpose of obtaining access to coal or any other minerals outside the bounds thereof.”²³ The case dragged on for two more years. In 1877, a lawyer wrote that the previous findings were “...only for the surface damage arising from the mining operations” which differed from whether or not Alloa Coal were allowed to go through the coal wastes under Blair’s farm land as part of the mining process. According to this lawyer, “...Alloa Coal Company does have the right to make and use passages through the coal wastes in the whole three pieces of ground.”²⁴ In the end, Alloa Coal was forced to pay Blair £70 for “expenses connected to surface damage and breach of [I]nterdict,”²⁵ making Blair, if not the environment, the winner.

²¹ *Ibid.*

²² *Ibid.*

²³ National Archives of Scotland, Answers for the Alloa Coal Company to the petition and complaint of James Blair VS Alloa Coal, 22 November, CB24/161, 1875, p. 2

²⁴ National Archives of Scotland, Lawyer’s letter, CB24/161, 10 July 1877.

²⁵ National Archives of Scotland, Harris to Roxburgh, CB241/161, 7 February 1879.

Whether or not Blair's primary motivation in bringing this case against Alloa Coal was borne of fiscal or environmental concerns, or whether it was out of spite against the competition from the larger, more profitable industrial concern is immaterial. His case proved that physical landscape change was having negative impacts even on land intended for agricultural purposes. Such rendering of land as waste is, of course, a common feature of edgelands.

By the time of the reopening of the Devon Colliery in 1880, its new above-ground infrastructure was a monument to the progress of the times. Despite the fact that its below-ground operations had been rendering the area waste for more than fifty years by this time, the site was not perceived as derelict. Even the fact that the new pumps created an outflow "...which made a very decided impression upon the River Devon" was noted with more admiration than trepidation by the *Alloa Advertiser*.²⁶ The idea that mining could have an impact on the environment beyond physical landscape change that would cause dereliction and contamination even outside the boundaries of the site had already begun and would become even more significant over the course of the next sixty years. From 1835 to 1880, however, the site's edgeland status was determined by the dislocation created by the dissonance between the below ground struggles of man versus water, and the above ground consequences of these struggles.

The earliest documented case of coal mine water as a source of pollution and contamination came from 1825 when

...some of the workmen of the Alloa Colliery were clearing out an old level, at Coalsnaughton, they came upon a second one which burst forth with such impetuous fury, as to threaten the lives of all in the workings....The torrent...emptied its contents into the river Devon, changing the colour of the stream into a clayey red. Some

²⁶ 'Extensive Mining Operations at Devon', *Alloa Advertiser*, 9 September 1882.

hours after this several salmon and trout were seen, seemingly in a sickly state...²⁷

However, neither the clayey red stream nor the sickly state of the trout seemed to have been of great concern and the public did not perceive the river as contaminated or polluted. In fact, the event was more of a celebration which "...required but little confirmation to raise the whole country-side to catch the unresisting prey....During the night the '[S]weet winding Devon' was gemmed with a thousand lights, and the work of death carried on to an almost incredible extent."²⁸ Pollution caused by mine water was not recognized as contamination for almost another seventy years until 1893, when the County Medical Officer of Clackmannanshire reported that "[B]elow Tillicoultry the stream is very much fouled by the water from the Devon coal pit and also from the dust, etc., removed by the process of 'coal washing' which goes on at the pit."²⁹ Concerns about industrially-generated water pollution spurred by the county medical officer's report spurred the Council to attempt to take action between 1893 and 1897. Then in 1926 the Devon Angling Association was the first citizens' body to petition for clean-up of the river.³⁰ Two other land damage cases were heard during this period, but, unlike Mr Blair from the previous period, the claimants, William Drysdale³¹ and J. E. Wilson,³² did not have the satisfaction of holding Alloa Coal responsible. Finally, mine water discharge from pit workings did have some bearing on a river drainage scheme for the Devon implemented between 1942 and 1943.³³ The deciding factor in determining edgeland status at the Devon Colliery during this period was the awareness and acceptance of

²⁷ 'Trout Catching Extraordinary', *Stirling Journal*, 22 December 1825.

²⁸ *Ibid.*

²⁹ National Archives of Scotland, Report on Pollution of the River Devon, by the County Medical Officer of Clackmannanshire, to Sub-committee appointed by the County Council as District Committee to consider the subject: The Devon, DD13/2662, 10 December 1893.

³⁰ Devon Angling Association Archives, Minutes of meetings, 1926.

³¹ National Archives of Scotland, William Drysdale to Alloa Coal Company, CB24/161, 29 April 1896.

³² National Archives of Scotland, Claim made by J. E. Wilson, farmer, Burnside and Kersiepow, Alva, for loss and damage to his crops and grazings through the mineral workings of the Alloa Coal Company, Limited, against said company, CB24/150, 4 September 1909.

³³ National Archives of Scotland, Report to Mr. McCallum by Messers Macfarlane, Bell and Craig, AF44/282, undated.

changes in environmental quality caused by pollution and contamination. The characteristics of the site were at this time coming more in line with those of a classic edgeland. No longer was environmental change simply a matter of physical transformation on the site itself. By virtue of the River Devon, deterioration could now be felt to have far wider effects. While the land was not yet wasted in terms of its purpose as a coal mine, it was becoming increasingly derelict. The possibility of mitigating such dereliction while simultaneously continuing mining operations was becoming more and more remote.

Clackmannanshire Council's awareness of, and attempts to take action against industrial pollution followed a very similar pattern of disappointment and defeat as existed across Britain in the late nineteenth century.³⁴ Three years after the County Medical Examiner issue his report indicting coal as one pollution source on the Devon, the County Council determined to set up a conference with local manufacturers to look into the matter of pollution prevention on the Devon. The Council mainly implicated the distilleries on the Devon and in fact Alloa Coal was not one of the industrial concerns invited to the conference.³⁵ Naturally, at the conference, various manufacturers, including Messrs John Henderson and Son of Springburn Mill, Alva, denied being polluters. The Provost of Alva himself "intimated that he attended only as a Manufacturer,"³⁶ obviously showing his desire to place his manufacturing concerns above the Council's pollution concerns. The Council then had no choice but to turn to the Secretary of Scotland. Less than two weeks after the conference, Thomas Young, Deputy County Clerk of Clackmannanshire applied to the Secretary of Scotland "...for authority under part III section 6 of the Rivers Pollution Prevention Act of 1876 to take proceedings against the various parties who are known to

³⁴ See, for example, T. C. Smout and Marie Stewart, *The Firth of Forth: An Environmental History* (Edinburgh, 2012), p. 150.

³⁵ National Archives of Scotland, Excerpt from minute of meeting of the county council of the county of Clackmannanshire for public health purposes, DD13/2662, 29 May 1896.

³⁶ National Archives of Scotland, Minute of the meeting called by subcommittee—conference, DD13/2662, 5 June 1896.

pollute the waters of the said River Devon.”³⁷ In a fashion typical of the times, the Secretary responded that “[T]he fact of pollution in this area seems sufficiently certain and what is required is proof that the pollution can be reasonably stopped without injury to manufacturing interests.”³⁸ In other words, profit was to take precedence over pollution, even in enforcing the law. Apparently unsatisfied by the lack of interest shown by the Secretary of Scotland for enforcing its own Act, the County Clerk in January 1897 wrote to the Undersecretary for Scotland that the Council itself would take its own action against Dollar, Tillicoultry and Alva burghs under part II of the Rivers Pollution Prevention Act. Meanwhile he continued to press the Secretary to proceed under part III of the Act “...against Manufacturers in the County who are causing or knowingly permitting to fall or flow or be carried into the River Devon polluting liquids from their Manufactories.”³⁹ In March, the Scottish Office replied, again much in the fashion of the time, that they would have no problem implementing part III of the Act, “...save that experience has shewn elsewhere, that the result of such actions is very doubtful, and that even if you are successful...the sewage...along the river bank between the various populous places...will remain unprovided for.”⁴⁰ So, even if the Council and the Scottish Office could break the manufacturer’s usual defence of ridding their pollution using the “best practicable means,”⁴¹ ie., by using the least expensive, thus least effective methods, the river would remain polluted by sewage from places not under burgh jurisdiction, such as miner’s communities at Fishcross and Howetown. Instead, the Scottish Office recommended that the County obtain a Private Act of Parliament to deal with the

³⁷ National Archives of Scotland, Thomas Young to Secretary for Scotland, DD13/2662, 16 June 1896.

³⁸ National Archives of Scotland, Secretary for Scotland minute papers, DD13/2662, 17 June 1896.

³⁹ National Archives of Scotland, County Clerk of Clackmannanshire County to Undersecretary for Scotland, DD13/2662, 9 January 1897.

⁴⁰ National Archives of Scotland, Colin Scott Moncrieff to County Clerk of Clackmannanshire, CR10/686, 3 March 1897.

⁴¹ c. 75, Rivers (Pollution Prevention) Act 1876, 39&40 Vict., quoted in Smout and Stewart, *The Firth of Forth: An Environmental History*, p. 155.

pollution, or to proceed under section 76 of the Public Health Act of 1867 to get a special drainage district for the Devon Valley.⁴²

Utterly frustrated by this bureaucratic run-around obviously controlled by manufacturing interests, Clackmannanshire Council, like so many other local authorities with a nascent awareness of pollution issues at this time, gave up the idea of trying to use such an ineffective law to serve environmental justice. On 26 March 1897, the County Clerk wrote one last time to the Undersecretary that the District Committee of the County Council that they

...have not had the advisability of proceeding under Private Act of Parliament...They have, however, very fully considered the suggestion...as to the formation of a Special Drainage District...but there are such insuperable obstacles in the way...not only on the ground of expense, but also from the fact that the other parties...do not look upon the project with favour, that they are not disposed to proceed with it. In these circumstances, and, looking to the fact that...the result of the proceedings under Part III of the Rivers Pollution Prevention Act are so much in doubt, the District Committee have reluctantly decided to drop the matter altogether...⁴³

While the role of Alloa Coal in influencing these proceedings is unknown, what is certainly evident from the three year attempt by the Council to address the report of mine water, coal washings and other manufacturing pollutants is that Devon Colliery, like other industrial concerns in the area, was treated as are edgelands in the present day. External management by local authorities takes a hands-off approach and the sites are left to their own devices until more catastrophic incidents provoke citizens as well as public officials into action.

Such a time finally came in 1926, when the Devon Angling Association, formed in 1905 to “provide affordable trout fishing for the local community and to act to protect and

⁴² National Archives of Scotland, Moncrieff to County Clerk, CR10/686, 3 March 1897.

⁴³ National Archives of Scotland, County Clerk of Clackmannanshire to Undersecretary for Scotland, DD13/2662, 26 March 1897.

enhance the river environment”⁴⁴ made a complaint to George Donald, Assistant Sanitary Inspector for the Burgh of Tillicoultry. Again, however, as was the case thirty years prior, even though coal pollution helped instigate action, the result was not so much to deal with the mine waste, but to deal with sewage. Donald corroborated the fishermen’s observations that

...one of the most serious sources of pollution, is to be found a few yards below Shavelhaugh Bridge, being the effluent from the Coal Washing Plant belonging to the Alloa Coal Company...at Devon Colliery. I understand that about 2000 tons of coal is washed at this colliery every week. There were tanks erected to act as settling Ponds for the water before it entered the river. These ponds filled up...the whole of the washing water enters the river without any treatment at all, with the result that for miles below the colliery the bed of the river is silted up with coal washing 8 to 10 inches thick...⁴⁵

Although a report by the County Medical Officer a year later noted “settling tanks completed and alterations made in coal washer,”⁴⁶ the Angling Association at their 1927 annual general meeting dealt with pollution matters in a “long discussion.” Representatives from Alva reported on pollution from Glenochil distillery, sewage, and “...coal dust from Devon Colliery which was stated to be the worst factor in the pollution question.”⁴⁷ However, rather than waste his efforts on industrial pollution at Devon Colliery, the County Medical Officer apparently decided to appeal to the Scottish Board of Health to focus on the sewage pollution emanating from Howetown, the miners’ village directly adjacent to the colliery on the bank of the Devon. Although the Scottish Board of Health provided WC accommodation at Howetown, they were not forthcoming with a cesspool because “[T]he ditch into which the sewage from Howetown is discharged is...flushed continuously by pit water...”⁴⁸ Ironically, one source of pollution, the pit water, was being used as a deterrent to the second problem,

⁴⁴ ‘The Devon Angling Association’, <http://devonanglingassociation.org.uk/about-3>. [Accessed 1 August 2014].

⁴⁵ National Archives of Scotland, George Donald to Richard Bernard, DD13/2662, 15 February 1926.

⁴⁶ National Archives of Scotland, Scottish Board of Health minute papers, report 21, DD13/2662, 1927.

⁴⁷ Devon Angling Association Archives, Minute of Annual General Meeting, 26 February 1927.

⁴⁸ National Archives of Scotland, Scottish Board of Health to Mr Hamilton, DD13/2662, 9 May 1927.

the sewage. Unfortunately, neither served to improve the quality of the Devon, if notes of the Angling Association of complaints they sent to the various councils in the area are any indication.⁴⁹ Even by 1927, eight inch coal washing silt along with solid sewage was not perceived as threatening enough to humans or fish in a context wider than the site of the Devon Colliery and its related accommodation to be addressed more punitively by either local or national authorities. Devon Colliery remained apart as an edgeland, king of the hill of its own making.

Although the outcomes were starkly different, the two land damage cases from 1896 and 1909 respectively followed complaints similar to those made by James Blair thirty years previously. William Drysdale wrote in 1896 that:

My damaged ground is all lying in grass and has all got a heavy top-dressing this spring with artificial manure and in consequence is at the present moment looking at its best and would require to be seen at least three times during the season before anything like an accurate or even an approximate estimate of the damage done to it could be ascertained.⁵⁰

According to Drysdale, "...so far as my lease with Lord Mar is concerned, I am to be paid compensation for all such damaged ground as the same shall be ascertained by arbitration."⁵¹ If Alloa Coal's 1887 agreement with James Johnstone was any indication, they were responsible to "relieve the landlord of farm tenant's claim" and would "pay 25 years purchase of the agricultural value."⁵² However, Roxburgh, as manager of Devon Colliery at the time, wanted to compensate Drysdale only for his crop, rather than for the surface damage to the land itself. By 1909 when J. E. Wilson claimed "...loss and damage to his crops and grazings through the mineral workings of the Alloa Coal Company,"⁵³ lawyers for manager James

⁴⁹ Devon Angling Association Archives, Minute of meeting of committee, 26 May 1927.

⁵⁰ National Archives of Scotland, William Drysdale to Alloa Coal Company, CB24/161, 29 April 1896.

⁵¹ *Ibid.*

⁵² National Archives of Scotland, Carmichael and Miller, CB24/150, 9 September 1909.

⁵³ National Archives of Scotland, Claim made by J. E. Wilson, farmer, Burnside and Kersiepow, Alva, CB24/150, 4 September 1909.

Bain rebuffed Wilson by arguing successfully that he "...has no claim for crops grown on land unfit or unsuitable for cultivation."⁵⁴ In other words, it was Wilson's own responsibility to know the land was already damaged before he attempted to cultivate it. These stories illustrate the point that, as Alloa Coal became a more industrial concern with profits foremost in its thinking during this time, it became more inured to environmental damage. Its policies concerning its responsibilities to the land could no longer even unintentionally protect it, resulting in the degradation which made the site an edgeland.

By the early 1940s, some national attention finally focussed itself on the quality of the River Devon. However, even this attention was, at least on the surface, less on pollution matters and more on flooding and drainage concerns "...for the improvement of agricultural land situated within the catchment area of the Devon."⁵⁵ The drainage scheme proposed in 1942 involved "...the deepening, widening and improvement of the river for a distance of fully 5 miles from half a mile upstream of its confluence with the Forth to Old Sauchie Village and...the removal...of the disused bridge over the River near Old Sauchie"⁵⁶ The synchronicity of the location for this drainage scheme and the location of the Devon Colliery points to the mine as bearing at least some responsibility for flooding on the river downstream of its workings. A draft of the drainage scheme noted:

It is the opinion of the majority of landowners and occupiers of land in the area that in addition to water from the pit workings being discharged into the river (apparently a legitimate process) a great deal of coal washings are also discharged directly into the river without going through any settling. In as much as this matter may have a fairly important bearing on maintenance it appears to us that some investigation might be desirable.⁵⁷

⁵⁴ National Archives of Scotland, Carmichael and Miller to Bain, CB24/150, 10 November 1909.

⁵⁵ National Archives of Scotland, J. R. McCallum to County Clerk of Clackmannanshire, AF44/282, 19 November 1942.

⁵⁶ National Archives of Scotland, J. R. McCallum to H. Biggs, AF44/282, 29 December 1942.

⁵⁷ National Archives of Scotland, Report to Mr McCallum by Messers Macfarlane, Bell and Craig, AF44/282, undated.

Mr Banks of the Cambus Distillery also noted that work on the drainage scheme would result in the accumulation of "...a considerable amount of silt and coal dust" at the weir at the distillery and was "...assured that abnormal silting would result in steps being taken to have such silt removed."⁵⁸ Several points emerge here; the first is simply that the coal washing plants and settling tanks installed in 1926 were, twenty years on, apparently not doing their job and that the impact of the resulting silt was raising the bed of the river and contributing to flooding. The second point is that finally, sixty years after the beam engine began pumping, there is some acknowledgement that its enormous power did actually have an effect on the river's environment. Unfortunately, once again, even at mid-century, industrial concerns about pollution took precedence over agricultural concerns. The silting of the river had been evident for fifty years before it was recognized as a significant enough problem for national attention, but when Cambus Distillery was concerned about silt removal clogging up their weir, they were assured immediate action. Finally and most importantly for the future of the River Devon and the edgeland status of the Devon Colliery site was that, even though concerns about unsettled coal washings were officially noted, they receive no further attention during the life of the mine. Furthermore, in the assessor's reports of the acreage of land benefited and costs recoverable from the scheme, Devon Colliery is listed at 3.4 acres, with no recoverable costs, and then, the item is crossed off the report.⁵⁹ Despite its impact on the environment, the colliery site was still a land easily ignored; so much so that the very cause of the problem was not seen as benefiting from the solution. Although the drainage scheme was the first recognition that pollution from the Colliery had a wider context, there were no efforts to mitigate the problem at its source. And in fact, this was to remain the case into the final fourteen years of the Colliery's existence.

⁵⁸ National Archives of Scotland, Note of meeting held at St. Andrew's House, AF44/282, 13 January 1943.

⁵⁹ National Archives of Scotland, Summary of Acreage Benefited, and Assessments, in parishes, AF44/282, undated.

Between abandonment in 1960 and mitigation in 1977, evidence of environmental change at the site of the former colliery grows thin, as might be expected of a location which had achieved classic edgeland status. If an edgeland is a place that can be easily ignored, then the abandoned Devon Colliery certainly qualified during this time period. That erstwhile keeper of the River Devon, the Devon Angling Association, reported nothing but sewage pollution issues on the river between 1949 and 1967. In 1967, the Association did note that the river between Cambus and Tillicoultry needed to be dredged as it had been twenty years previously, yet no note was made as to what was necessitating the dredging, or whether it actually took place.⁶⁰ Between 1968 and 1973, mine pollution from the Dollar Mine was a significant concern to the Association; the fact that there was no such indication for the Devon Colliery site is possibly telling of its environmental quality during this time. The Association did complain that “effluent discharge to the river just below Dollar—had been due to the driving of new levels in Dollar mine.”⁶¹ They reported that the Purification Board “...indicated that the Coal Board had been told in no uncertain terms that this pollution must cease immediately.”⁶² However, two years later, the Association’s secretary “...found a most disgraceful state of affairs...where coal washings completely obscured the river bottom in about one foot of water.”⁶³ Apparently, “...a pump was actually pumping slurry from a settling area directly into the river” and the Coal Board “eventually” agreed to “...take steps to make sure that this would not happen again.”⁶⁴ The efforts of the Association at the Dollar mine location indicate that, had similar issues of abandoned mine water drainage plagued the River Devon at the Devon Colliery site during this time, they would certainly have been noted and even dealt with proactively.

⁶⁰ Devon Angling Association Archives, Minute of Annual General Meeting, 16 November 1967.

⁶¹ Devon Angling Association Archives, Minute of Annual General Meeting, 21 November 1968.

⁶² *Ibid.*

⁶³ Devon Angling Association Archives, Minute of Annual General Meeting, 15 November 1971.

⁶⁴ *Ibid.*

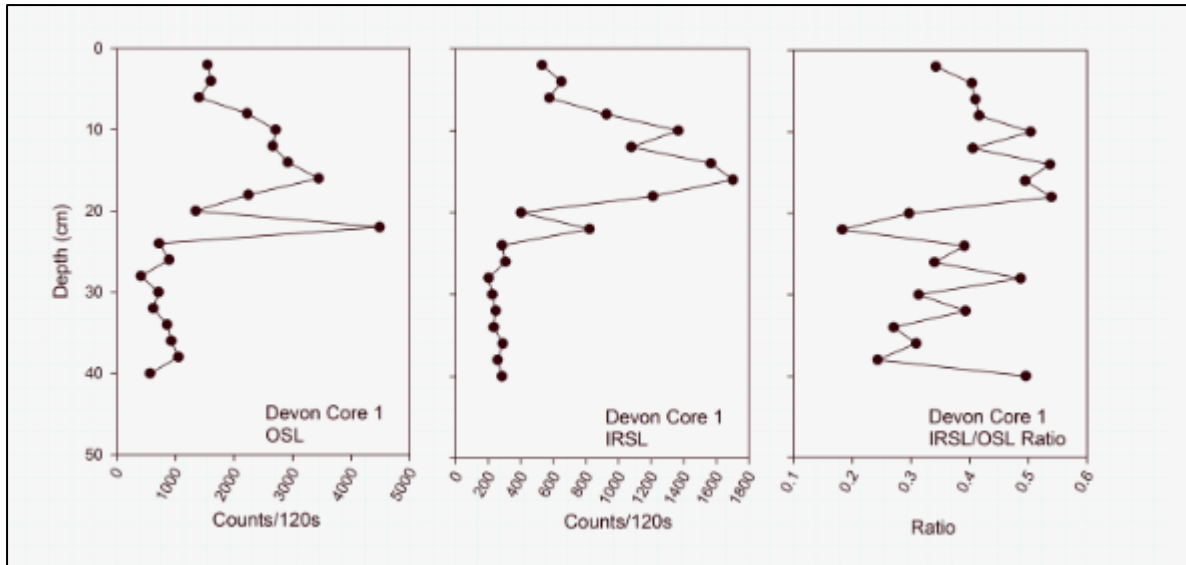


Figure 12: OSL/IRSL readings for Devon Core 1⁶⁵

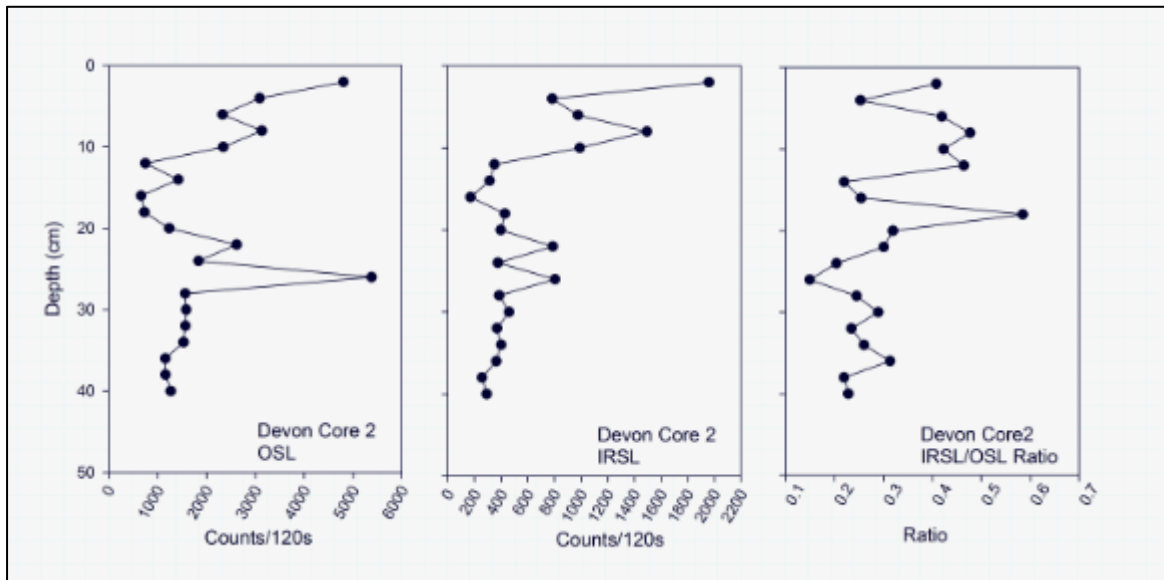


Figure 13: OSL/IRSL readings for Devon Core 2⁶⁶

To the naked eye, then, no obvious contamination of the Devon Colliery site existed. The visible physical changes to the site have already been noted,⁶⁷ but less-obvious clues may have been left behind in the accumulation of the sediment layers from the lower slopes of the bing to the bank of the river. OSL/IRSL readings of the two cores taken from this site⁶⁸ indicate signals below the rate of detection for the bottom 18 cm of the core (see figs. 12 and

⁶⁵ W. Paul Adderley, 2014.

⁶⁶ Ibid.

⁶⁷ See Chapters 1 and 2.

⁶⁸ See Appendix A for procedures.

13). This material is therefore organic and as such says nothing about environmental quality at the site. Older sedimentary material gives off a stronger OSL/IRSL signal, and would be expected to show up at greater depths. In the two Devon cores, material between a depth of 6 to 22 cm actually shows a stronger signal, indicating that in this case, older material has actually accumulated at less depth than might have been anticipated. Also of note is the spike in signal at 22 cm, possibly indicating an anomalous event that might have caused a variation in the sediment's signal at that depth. In addition to the signal spike at this depth, the physical characteristics of both cores also show marked change, becoming much darker and containing far greater amounts of coal debris. The OSL/IRSL evidence along with the changes in physical characteristics could possibly help to corroborate the story of environmental change along the River Devon at the former Devon Colliery site although it cannot pinpoint the exact time of or reason for the change. The dredging of the Devon in the 1940's could have possibly deposited older sedimentary material on top of new, or regrading during mitigation could have moved older material from deeper regions of the bing over the top of newer material. This speculation, however, only emphasizes the edgelands quality of the site of the former Devon Colliery during its period of abandonment. If more definitive information about the site's environmental quality had been available, it may have attracted more attention, sooner, resulting in a different management strategy that could have destroyed its edgeland legacy. The OSL/IRSL results indicating the area was fairly physically stable, along with the Devon Angling Association's lack of evidence of visible contamination actually allowed the abandoned Devon Colliery to remain an edgeland.

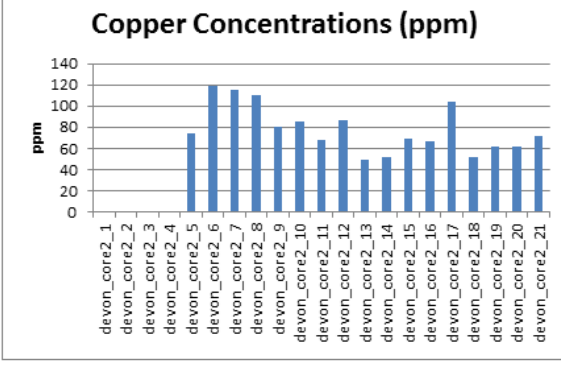
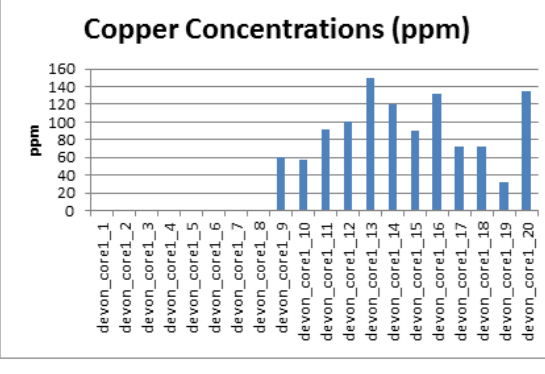
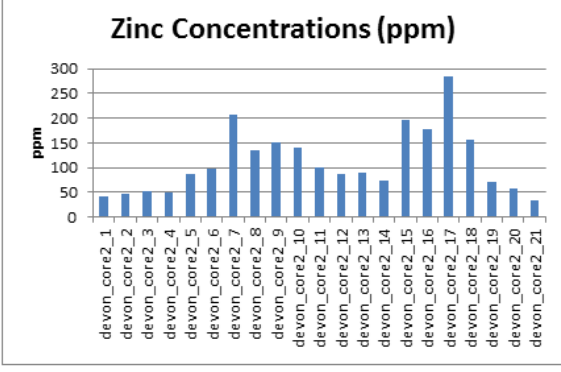
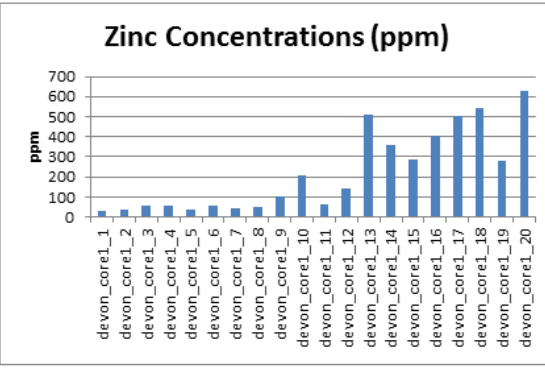
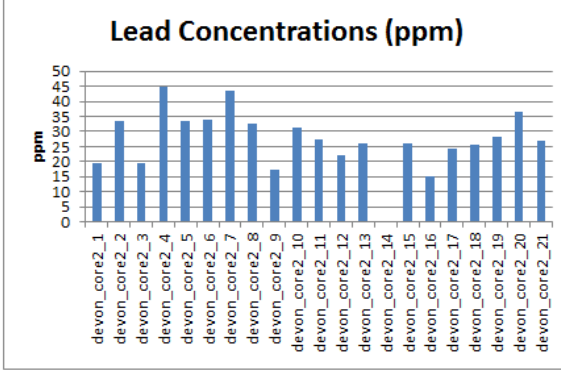
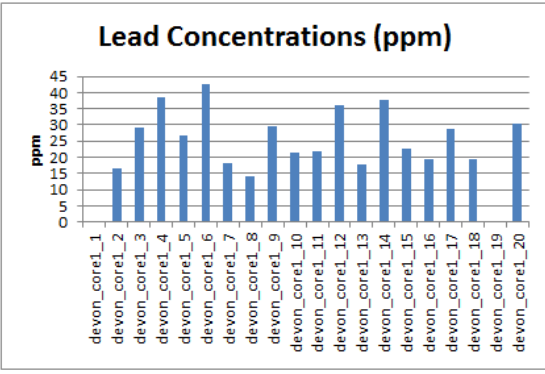
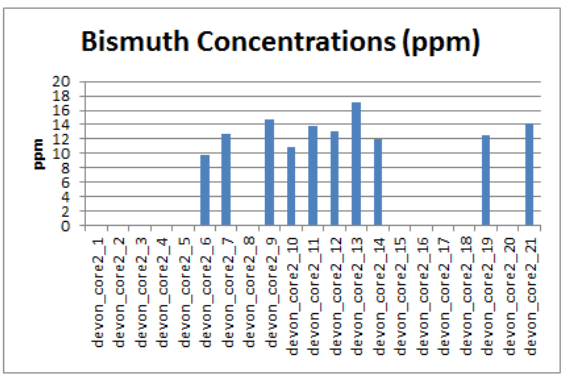
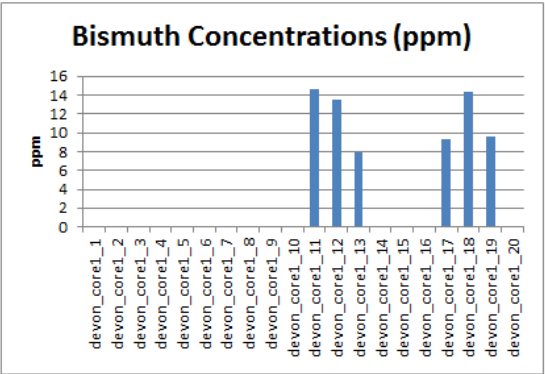
There is also little evidence of the effects of the CRC's mitigation of the Devon Colliery bing on environmental quality or the sustainability and resilience of the site. Again, the Devon Angling Association provides no evidence of pollution issues of any type along the stretch of the river between Tillicoultry and Cambus between 1977 and the present. This

was not that the Association had become less diligent in their efforts to protect the river. In 1994, they lodged further complaints when mine water from the former Dollar mine was creating ferruginous discharge at Vicar's Bridge.⁶⁹ The Association's impact is evident in the fact that just one year later, "[R]eed bed filtration of the old mine water below Vicar's Bridge was in operation,"⁷⁰ and in 2002 when flow to the reed bed had apparently stopped, the Scottish Environmental Protection Agency (SEPA) were informed and alterations were made.⁷¹ Had similar issues arisen at the former Devon Colliery from its purchase by the CRC in 1979 up to the present day, surely the Association would have addressed the issue through the relevant local authority.

⁶⁹ Devon Angling Association Archives, Committee meeting, 7 March 1994.

⁷⁰ Devon Angling Association Archives, Committee meeting, 11 December 1995.

⁷¹ Devon Angling Association Archives, Committee meeting, 27 March 2002.



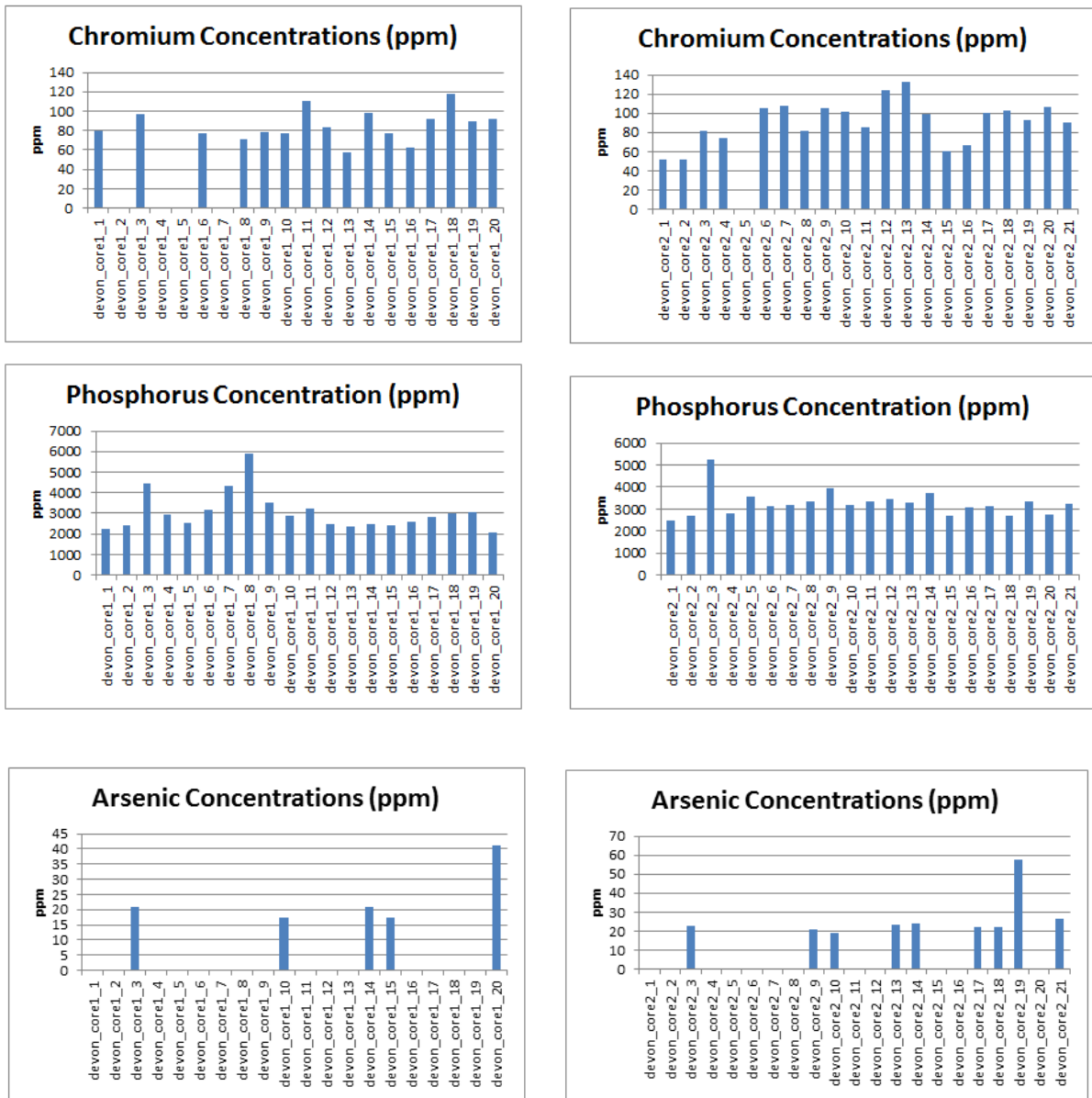


Figure 14: Concentrations of Heavy Metals in Devon Cores 1 and 2

Unfortunately, XRF results,⁷² while they do reveal some concentrations of heavy metals, do not provide evidence for the potential impact of the CRC’s mitigation efforts. In general, the results show a very small amount of heavy metal contamination, particularly in the bottom portions of the cores, below approximately 20 cm (see figure 14). Low levels of lead (Pb) concentrations show up throughout the cores. Zinc (Zn) concentrations increase

⁷² See Appendix A for XRF procedures.

with depth in core 1 and are found intermittently in core 2. Similarly, copper (Cu) is found toward the base of core 1 and is much more prevalent in the upper portions of core 2. Trace values of chromium (Cr), bismuth (Bi) and arsenic (As) are also detected. Levels of phosphorus (P) above 1000 ppm are higher than normal field systems would indicate; possibly telling of the animal habitation of the area in the years it was used for grazing and horseback riding. The depths at which the higher concentrations of bismuth are found in cores 1 and 2 could be associated with the physical presence of both coal waste and brick debris in the subsamples. The bricks on the site were a product of Alloa Coal's brickworks and were in fact made from the colliery's coal waste. Since bismuth can be associated with coal, its presence may be a by-product of mining and brick making. It would have existed on the site along with the coal regardless of human activity there. The same holds true for arsenic, also associated with coal. Higher concentrations are associated with depths that also contain fragments of coal and/or brick.

Since most of the heavy metals detected by XRF are associated with coal, there is no way of knowing whether their presence was naturally occurring or caused by anthropogenic activity. Similarly, there is no way of knowing whether levels of their concentration were higher prior to mitigation or whether their location in the bottom half of the cores is due to the fact that they were redistributed or buried during the course of mitigation. What XRF results to help establish, however, is that pollution by itself cannot determine edgeland qualities. The insignificant levels of contamination detected by XRF results help demonstrate the idea that a site does not have to be polluted in the present in order to be considered an edgeland. Other qualities, including the evolution of the environmental quality of the site, are more important for determining what an edgeland is than are descriptions of the location at a single moment in time. Of additional importance is the public response toward the environmental qualities of a site, including its pollution. Once established as an edgelands,

the actual level of its pollution matters little to a public who has grown accustomed to ignoring the space. This, in turn, has a significant impact on the regulation of these spaces as will be demonstrated in chapter four.

Chapter IV

Regulation, Response and Reaction

One of the hallmarks of historical edgelands that has emerged thus far from the story of the Devon Colliery site is the ambivalence displayed toward its changing landscape, management and environmental quality. In the early years of the Devon Colliery, the Erskines and the Balds faced three dichotomies that were to shape the site's edgeland qualities: the first being the tension between agriculture and industry, the second the dilemma between environmental and economic interests, and the third the inconclusive impact on environmental quality resulting from the struggle between humans and nature. During its initial forty five years of managing the Devon Colliery, Alloa Coal attempted to make the cultural dominate the natural. This resulted in the ambiguity in the contemporary descriptions of the area and a sense of dislocation between the below ground struggles and above ground industrial infrastructure. In this twilight period just prior to the site becoming fully industrialized and wasted for any purposes other than industry, economic decisions made by the management of Alloa Coal may have not purposely addressed the environment. However, they did often have the unintended and temporary consequence of helping to protect the environment of the site. Once the colliery reopened in 1880, the ambivalence in the purpose of the site both economically and environmentally was replaced with the discrepancy between the significance of the space economically to Clackmannanshire versus the fact that its increasing dereliction and contamination isolated it even further. By the early twentieth century, the colliery was a self-sufficient space, set apart from the concerns of its neighbours, and managed by Alloa Coal to keep it that way. The sole purpose of the space was now for economic gain; with no more even inadvertent environmental protection. Because its isolated location allowed it to be managed as a space apart, mitigation of the

site's increasing pollution and waste was not even attempted until its wider effects were felt by virtue of the River Devon.

Once the National Coal Board (NCB) abandoned the Devon Colliery in 1960, The Central Regional Council (CRC) and the Clackmannanshire District Council (CDC) faced the edgelands management paradox: whether or not management of the abandoned site would allow it to maintain its edgeland legacy. The CRC's initial motivation in returning the built to the natural seemed to be more environmental than economic as they themselves recognized that the site served no further industrial purpose. They seemed more intent on creating a space in which agriculture would once again coexist with the legacy, at least, of industry, thereby coming full circle to the ambiguity that initially created the edgeland. For a brief twenty year period, the two councils attempted to resolve the ambiguity of the former colliery site by designating it for tourism, leisure and recreation. However, this mission was abandoned in favour of a purpose more in line with the landscape's edgeland qualities. Throughout the two hundred year history of the site, the ambivalence that both created and defined the site's edgeland status ultimately displayed itself in the regulatory response and public reaction to edgelands' regulation; furthermore, response and reaction in turn helped perpetuate the site's edgeland status. Legislation and regulation of coal waste, water pollution, and planning authority all contributed to the ambiguity that was the key characteristic of the Devon Colliery as an edgeland.

Although Robert Bald and John Francis Miller Erskine parted ways in 1835 over Bald's vociferous deploiment of the lack of regulation concerning female mine workers,¹ the Erskine enterprise in the early years of the nineteenth century was in no way limited by any sort of mining regulation. Mining on the Erskine estate was an extension of agriculture, a

¹ John Lees Carvel, *One Hundred Years in Coal, the History of the Alloa Coal Company* (Edinburgh, 1944), p. 23.

private enterprise on a private piece of land not yet even fully incorporated into the national economy, creating an edgelands loophole in the necessity for any sort of mining regulations, environmental or otherwise. While it seems safe to say that Robert Bald's exhortations on the evils of female and child mine labour finally had some measure of positive impact in the passage in 1842 of the earliest piece of mining legislation which outlawed their employment,² no such justice for the environment was forthcoming. Even though an item of international environmental interest, the Sauchie Colliery fire, along with a burning mine at Astley Collieries in Lancastershire apparently caught the attention of the "members of the committee of the House of Lords who sat in 1848 to consider the best means of preventing accidents in coal-mines,"³ the resulting Regulation and Inspection Act of 1850⁴ did not extend itself to the regulation and inspection of the environmental impact of mining. Such was the pattern of legislative response to coal mining throughout the nineteenth century and early twentieth centuries. The ambiguous state of the coal mine landscape such as that found at Devon Colliery made it apparently less valuable than the lives of the workers who transformed it. Although incidents such as the fires at Sauchie and Astley or the water damage and subsidence complaints against Alloa Coal would have had at least economic if not environmental impacts which might have been mitigated through appropriate legislation, more concern was shown legislatively for the effects of such disasters on the health and safety of workers. Throughout the nineteenth century, the ambivalence generated by mining landscapes made itself felt in the regulation of the coal mining industry. Left to their own devices, the managers of these landscapes continued to serve their own, sometimes paradoxical notions concerning environmental damage. As is the case for contemporary

² c.99, Mines and Collieries Act of 1842, 5&6 Vict.

³ Edward Cayley, 'Burning Waste of Clackmannan', *The Living Age*, 30 (1851), pp. 32-33. (accessed online).

⁴ c.100, An Act for the Inspection of Coal Mines in Great Britain 1850, 13&14 Vict.

edgelands, lack of regulation of the effects of mining on the landscape resulted in the designation of sites like the Devon Colliery as edgeland.

Coal mine leases from the earliest days of estate mining always had some sort of language delineating the tack holder's responsibilities concerning damages to the land,⁵ and the leases for Devon Colliery were no different. All leases between 1835 and 1910 to which Alloa Coal were held responsible referred to compensation for land damage, perhaps eliminating the need for statutory protection of the mining environment. If the coal company were fiscally and legally responsible for employing mining techniques which would be the least invasive to the environment, then some degree of environmental protection would follow, no matter how inadvertent. James Bain's 1910 decision to absolve Alloa Coal of any sort of legal liability for subsidence, flooding, or crop damage by changing the language of its leases eliminated any sort of consideration of the impact of mining on the environment. This resulted in the period of some of the greatest environmental degradation at the site. Perhaps as a counter measure against both changes in lease language and changes in the landscape at places like Devon Colliery, the Coal Mining (Subsidence) Act was passed in 1957, making the government responsible for providing compensation to local authorities for subsidence damage.⁶ By the time such regulation came to Devon Colliery, however, it was too late to have any impact on decisions made by NCB, who had already started to wind down operations at the Colliery in 1958. Once abandoned in 1960, the abandoned Devon Colliery escaped regulation and was left to decay in true edgelands fashion.

No indication of incidents of subsidence in or near the Devon Colliery site exist post-abandonment, but in the 1960's the Devon Colliery bing would have loomed large on the horizon, a legacy of the site's contamination and decay, and, following the Aberfan disaster

⁵ Baron F. Duckham, *A History of the Scottish Coal Industry, Volume 1: 1700-1815, A Social and Industrial History* (Newton Abbot, 1970). p. 164.

⁶ c. 59, Coal-Mining (Subsidence) Act 1957, Regnal. 5&6 Eliz. 2.

in 1966,⁷ a reminder of the continued dangers of the mining environment. Legislation addressing Aberfan came in 1969 with the Mines and Quarries (Tips) Act which conferred on local authorities the responsibility to ensure “that disused tips do not, by reason of instability, constitute a danger to members of the public.”⁸ Two years later, the 1969 Act resulted in The Mines and Quarries (Tips) Regulations 1971 which spelled out the means by which bings would be made safe for the public.⁹ Once again, however, the timing of the abandonment of Devon Colliery caused it to fall into a regulatory murk. Clearly the tip fell under the terms of the 1971 regulations. The area of land covered by the bing (see fig. 7) “exceed[ed] 10,000 square metres,”¹⁰ and the height of the tip, at least 50 meters, exponentially exceeded the regulated height of 15 meters.¹¹ Most parts of the tip were “...more than 4 metres above the level of any part of the neighbouring land within 50 metres of the perimeter of the tip.”¹² Finally, the volume of the Devon Colliery tip exceeded the 10,000 cubic metres allowable under the regulations.¹³ Despite the fact that the regulations called for active supervision of and reporting on the spoil heaps even once these tips had become inactive,¹⁴ there is no indication that either personnel or reports ever existed for Devon Colliery. Although the CRC, likely spurred to action by Aberfan and subsequent regulations, showed due concern throughout the 1970’s as it negotiated with the Coal Board over ownership and responsibility for mitigation, it was not itself complying with regulations that held it responsible for the bing’s potential health and safety risks. Thus the site remained an edgeland, ambiguous as to its safety and future functionality.

⁷ In 1966 in the village of Aberfan, Wales, a coal tip collapsed, burying the local primary school.

⁸ c. 10, Mines and Quarries (Tips) Act 1969, Part II section 12, paragraph 1.

⁹ Mines and Quarries (Tips) Regulations 1971, No. 1377.

¹⁰ *Ibid*, Part I, paragraph 2a; National Archives of Scotland, Map showing Rehabilitation of Derelict Land at Devon Colliery near Fishcross, DD27/5114, 22 February 1977.

¹¹ *Ibid*; Map showing Rehabilitation of Derelict Land at Devon Colliery near Fishcross.

¹² *Ibid*, Part I, paragraph 2b; Map showing Rehabilitation of Derelict Land at Devon Colliery near Fishcross.

¹³ *Ibid*, Part I, paragraph 2a and b; Map showing Rehabilitation of Derelict Land at Devon Colliery near Fishcross.

¹⁴ *Ibid*, Part II, paragraphs 4-8; Part III; Part IV.

Public response to the physical changes in the land rendered by Alloa Coal was limited to the subsidence, crop and water damage complaints documented between 1854 and 1909. At no point did these farmers or landowners press for outside intervention, either local or national, other than that of the courts. Neither did they mount any sort of effort to regulate land damage. The story of the public response to pollution and its regulation, however, differed slightly in that both local as well as national authorities were called upon to exercise their powers under that pollution legislation which did exist prior to 1950. Local response to pollution emanating from Devon Colliery via the River Devon initially followed much the same pattern as did such response nationally. The earliest concerns about pollution were based on notions promoted by Edwin Chadwick linking dirty water and disease and resulted in the passage of the Public Health Act of 1848.¹⁵ Still more oriented toward the menace of industrial pollution to public health than out of concern for the environment, the Alkali Act was passed in 1863.¹⁶ The Royal Commission on River Pollution first recognized the link between water and industrial pollution in 1872.¹⁷ Their work resulted in the Rivers (Pollution Prevention) Act of 1876 which made it an offence to dump solid matter into a stream, as well as discharging any type of sewage and “poisonous, noxious or polluting liquid from any factory or manufacturing process.”¹⁸ Unfortunately, the “best practicable means” clause in the Act rendered it virtually toothless.¹⁹ In most cases, including the industries along the River Devon, this clause meant that industrial polluters simply piped their waste into the new sewage systems which of course themselves eventually dumped into the river.²⁰

¹⁵ c. 63, An Act for Promoting the Public Health 1848, 11&12 Vict.

¹⁶ c. 24, An Act for the More Effectual Condensation of Muriatic Acid Gas in Alkali Works 1863, 26&27 Vict.

¹⁷ Report of the Royal Commission on River Pollution Fourth Report, Scotland, P.P. 1872, Vol. 2, quoted in T. C. Smout and Marie Stewart, *The Firth of Forth: An Environmental History* (Edinburgh, 2012), p. 150.

¹⁸ c. 75, Rivers (Pollution Prevention) Act, 39&40 Vict.

¹⁹ Rivers (Pollution Prevention) Act 1876, quoted in Smout and Stewart, *The Firth of Forth: An Environmental History*, p. 155.

²⁰ National Archives of Scotland, J. B. Hamilton, Rivers Pollution Prevention: River Devon, DD13/2662, 9 November 1926.

Public health was certainly foremost in the minds of residents of Tillicoultry, located just down the road from the Devon Colliery, whose newly-elected burgh officials were not afraid to go after offenders and created new water and drainage schemes for the village beginning in 1871.²¹ Despite their actions, the 1872 Royal Commission on River Pollution still found the River Devon below Dollar “...particularly bad, stinking and rainbow-coloured, in summer a seething mass of polluted and disgusting corruption, deadly in its effects on the life of both man and fish.”²² In a fashion somewhat ahead of its time, the local reports by the Clackmannanshire County Medical Examiner from 1893 indicted coal dust and other industrial pollutants rather than sewage for the “disgusting corruption” of the river. The County took the unusual step of attempting to take action against the river’s industries rather than pursuing the issue as a public health matter. Unfortunately, whether or not dust constitutes a “solid matter” is open to interpretation. Since coal discharge as such was not specifically covered under the 1876 Act,²³ the Secretary of Scotland recommended that the Council address the issue through the Public Health (Scotland) Act of 1867 which outlined public health duties given to burghs such as Tillicoultry.²⁴ Essentially, no one at any level of government and under any existing regulation could take Alloa Coal Company to task for their role in polluting the River Devon, even though local as well as national authorities recognized the damage to the River. The disconnect between the concern for cleanliness and order within the burghs themselves and the inability to control pollution created by the industries on their very doorsteps allowed the site of the Devon Colliery to remain an edgeland.

²¹ Eric J. Evans, *Tillicoultry A Centenary History: 1871-1971* (Tillicoultry, 1972), p. 17, pp. 22-23.

²² Report of the Royal Commission, quoted in Smout and Stewart, *The Firth of Forth: An Environmental History*, p. 313.

²³ Rivers (Pollution Prevention) Act 1876, quoted in Smout and Stewart, *The Firth of Forth: An Environmental History*, p. 160.

²⁴ c.224, An Act to Confirm the Provisional Order Under the Public Health (Scotland) Act 1867.

Things did not change much in the first half of the twentieth century, although in its 1926 complaints concerning coal washings from the Devon Colliery, the County Medical Officer tried to learn a lesson from the incidents thirty years prior and applied to the Scottish Board of Health rather than the Secretary for Scotland for assistance in the matter. Unfortunately the results were only negligibly better with the order for the installation of new settling tanks. George Donald, the County's assistant sanitary inspector summed up his frustrations as well as those of the Devon Angling Association with dealing with weak regulations and lack of national concern rather poignantly:

Yes, I did speak of vested interests and I really believe what I have said to be true, and I will give you my reason. For a great many years I have been in close touch with the Sanitary Inspector for the County of Clackmannan, and I have also made inspection along with the present and also the late Medical Officers of Health and I know that they were, and are, very anxious to bring about a purer Devon. But what do these efforts result in, nothing. They bring up a report before the County Council (you yourself know what the County Council is composed of), the report is commented on, and then laid aside, and nothing more is heard of it.²⁵

Such deeply-felt local response to the condition of the River Devon helped to counter the assumption that “vested interests” were still such a part of the fabric of early twentieth century local government that no one noticed or cared, and that views such as those expressed by Donald and the Angling Association would not eventually have a positive impact on the environment. Rather, these were the first inklings of concern that would eventually push the need for mitigation, even of an edgeland such as the Devon Colliery, into the fore.

This time finally came in 1951 with the passage of the Rivers (Prevention of Pollution) (Scotland) Act which replaced the virtually useless 1876 Act. Significantly for the River Devon and the Devon Colliery, the Act did actually make it an offense to deposit “...on

²⁵ National Archives of Scotland, George Donald to Richard Bernard, Pollution of the River Devon and complaint by Devon Valley Fishermen, DD13/2662, 15 February 1926.

any land the solid refuse of any mine or quarry so that it falls or is carried into a stream,”²⁶ although the Act came too late to address the concerns about silt from the Colliery noted in the 1942 drainage scheme reports. Again whether or not silt would be interpreted as solid matter that could then be used as evidence of the use of the stream for polluting matter by the National Coal Board was questionable. Furthermore, the Act still contained the “practicable means” loophole, stating there would be no penalty for the deposition of “the solid refuse of a mine or quarry or any land so that it falls or is carried into a stream if no other site for the deposit is reasonably practicable....”²⁷ Further steps were taken to deal with coal mine pollution in the Control of Pollution Act of 1974 giving water authorities

...the power to carry out studies for the purpose of ascertaining what problems relating to the pollution of relevant waters may arise or have arisen in consequence of the abandonment of any mine in its area...and what steps are likely to be appropriate for the purpose of dealing with the problems...²⁸

Unfortunately for the River Devon, no one appeared to have attempted to hold the Coal Board responsible for the pollution of the river by the Devon Colliery bing, and the issue of mine water, despite the water damage issues from the previous century, seemed non-existent in the twentieth. Although mine waste, both solid and liquid was now officially recognized as a polluting offence, Devon Colliery’s status as an abandoned edgeland set it off limits from regulation even as the CRC had begun to recognize the need for mitigation.

One of the key themes dominating coal mining and coal mine pollution regulation is the discrepancy between the lack of external oversight and the closely managed internal workings of the mine site as well as the surrounding mining communities. One of the reasons this duality set Devon Colliery, Fishcross and Howetown apart from their nearest neighbours

²⁶ c. 66, Rivers (Prevention of Pollution) (Scotland) Act 1951, Regnal. 10&11, Geo. 6, part III, section 22, paragraph 1c.

²⁷ *Ibid*, paragraph 4.

²⁸ c. 40, Control of Pollution Act 1974, part III, section 50, paragraphs a and b.

and which was an important component in maintaining the area as an edgeland was the structure of local planning authority throughout the life of the site. Under the control of both the Erskines and Alloa Coal, the Devon Colliery site was privately held land which, despite its location, appeared to have escaped the local authority of Tillicoultry parish and then burgh throughout most of the nineteenth century. Thus, projects such as housing improvement schemes put forward by Robert Bald in the early part of the century and the later scheme by Alloa Coal to provide water for Fishcross from Johnstone's Alva estate were internal management initiatives. However, the passage of the 1889 Local Government (Scotland) Act establishing elected county councils and especially giving them powers over public health matters²⁹ may have played an important role in the first external attempts to regulate the space by addressing its pollution in 1893. The County Council, perhaps with its longer arm and wider grasp than those of the individual burghs could see the potential impact for all of Clackmannanshire of the deterioration of the River Devon. Even though it did not succeed in its efforts, the new structure of local authority was beginning to make itself felt at least in terms of awareness of the problems of environmental decay. However, the long tradition of the internal management of a privately-held enterprise was not so easily broken. The tension between internal and external authority over the Devon Colliery site perpetuated its edgeland status at the end of the nineteenth and on into the twentieth century.

The power of local authorities to plan for the development and use of land within their jurisdictions received a considerable boost with the enactment of the Town and Country Planning (Scotland) Act of 1947.³⁰ What this meant for Devon Colliery and its neighbouring villages was that private ownership no longer gave proprietors the right to develop their land as they saw fit but that application for any potential land development had to be made to the local authority. According to the Act, "... 'development' means the carrying out of building,

²⁹ c. 50, Local Government (Scotland) Act 1889, 52&53 Vict.

³⁰ c. 53, Town and Country Planning (Scotland) Act 1947, Regnal. 10&11, Geo. 6.

engineering, mining or other operations in, on, over or under land, or the making of any material change in the use of any buildings or other land.”³¹ Therefore, any schemes to transform the landscape at the Devon Colliery came under the auspices of local authorities at burgh, district, or county levels for the first time in its two hundred year history. While Devon Colliery itself did not seem to generate any need to apply the Town and Country Planning Act, the Coal Board’s plans for the nearby Glenochil mine in the 1950’s did elicit public opposition from Alva, Tillicoultry and Dollar, “who argued the potential danger to roads, sewer and water services...if a large new mine was begun.”³² Even though the opposition amounted to naught, the Act at least showed that there were in fact public concerns about mining that otherwise may not have been heard had NCB had the power to establish the new mine without regard to local authority. Complaints about the proposals for Glenochil indicate that, had NCB planned to make major changes at the Devon Colliery, documentation of the public’s concerns would likely exist. As none do, the assumption is that NCB did not make any major change in the colliery’s infrastructure during its fourteen year management of the mine.

Notably, even the bing at Devon Colliery, the part of the colliery which was to leave the most lasting legacy upon abandonment in 1960, was subject to the planning authority of local government. The Act stated: “nothing in...this subsection shall be deemed to require permission in respect to the deposit of refuse or waste materials on a site already used for that purpose if the height of the deposit does not exceed the level of the land adjoining such site, and the superficial area of the deposit is not thereby extended.”³³ The height of the bing, at 53 meters, was certainly the highest point of the surrounding area, yet its location in an edgeland meant that it remained unremarked by either the public or the local authority until

³¹ *Ibid*, section 10, paragraph 2.

³² Evans, *Tillicoultry: A Centenary History*, p. 75.

³³ c. 53, Town and Country Planning (Scotland) Act 1947, Regnal. 10&11, Geo. 6, section10, paragraph 3b.

the 1970's. It took yet another reorganization of local government in 1973³⁴ to address the issue of the Devon Colliery bing. Once established the CRC took immediate advantage of their new authority to begin negotiations with NCB over mitigation of the site. Their efforts were aided by the update to the Town and Country Planning Act taking effect in 1975³⁵ which handed not only the power to mitigate derelict land to local authorities, but also grants covering the full cost of such operations. The only question remaining was whether or not mitigation of the bing would obliterate the site's edgeland legacy.

Contrary to the normative conception of an edgeland as a polluted, derelict and vacant wasteland, remediation of a contaminated site does not necessarily destroy its legacy as an edgeland. Defining the site of the former Devon Colliery not just as derelict according to guidelines set by the Scottish Development Agency under the 1975 Town and Country Planning Act, but also as "contaminated" would have been difficult at the time of remediation of the site as that designation was not statutory until the Environment Act of 1995 declared contaminated land as "...any land which appears to the local authority...to be in such a condition, by reason of substances in, on, or under the land that significant harm is being caused or there is a significant possibility of such harm being caused..."³⁶ According to this definition and XRF evidence, the site of the former Devon Colliery is not contaminated, and according to definitions created by the Scottish government in 1990 of vacant and derelict land,³⁷ neither does it fit those classifications. Yet still, the CDC could not find a sustainable, purposeful use of the site until 2010.

Fortunately for the legacy of the former Devon Colliery site, the issue of sustainability was dealt with legislatively in the 2006 update to the Town and Country Planning Act. The notes to the Act state that it "...also defines a new duty on planning authorities to exercise

³⁴ c. 65, Local Government (Scotland) Act 1973.

³⁵ c. 33, Town and Country Planning (Scotland) Act 1975.

³⁶ c. 25, Environment Act 1995, section 57, part IIA, 78A, paragraph 2.

³⁷ The Scottish Government, 'Scottish Vacant Land Survey 2001 Commentary', <http://www.scotland.gov.uk/Publications/2002/03/14438/1911>, 6 August 2014.

their development planning functions with the objective of contributing to sustainable development.”³⁸ The same year the Act was passed, the CDC arrived at the notion that new tenants for the former Devon Colliery site should “...protect the character of the landscape for the community.”³⁹ When the Equestrian Centre failed four years later, the CDC advocated for the approval of the Society for the Prevention of Cruelty to Animals’ (SSPCA) application based on the fact that it “...would provide sustainable development and enhance the status of Clackmannanshire as a place for Green Business.”⁴⁰ Without explicitly doing so, the addition of the sustainability language to the 2006 planning legislation helped to preserve the edgelands legacy of the former Devon Colliery site. It encouraged the Council to find a purpose for the site that would allow development of “underused brownfield land” that would also “...be compatible with the uses...of the surrounding land.”⁴¹ In other words, the Council, in approving the SSPCA’s application, wished to see mitigation of the site continued while recognizing the need for the mitigation which would not destroy the character of the area, a character which is imbued with the legacy of two hundred years of coal mining.

³⁸ Planning Etc. (Scotland) Act 2006, Explanatory Notes, Commentary on sections, Part 2.

³⁹ Gordon Stewart, ‘Lease of Devon Equestrian Centre, Fishcross, Clackmannanshire Council, 12 July 2006’, p. 2, <http://www.clacksweb.org.uk/council/reports/?title=equestrian+centre&author=&bodyid=&catid=&fromm=&fromy=&tom=&toy=&so=category&sub=1>. [Accessed 10 April 2014].

⁴⁰ Keith Johnstone, ‘Report of handling on planning application–Demolition of existing Devon Equestrian Centre Building and construction of SSPCA National Wildlife Centre with 2 houses for management accommodation at Equestrian Centre, Fishcross, Planning Committee, 9 February 2010’, p. 25, <http://www.clacksweb.org.uk/council/reports/?title=equestrian+centre&author=&bodyid=&catid=&fromm=&fromy=&tom=&toy=&so=category&sub=1>. [Accessed 10 April 2014].

⁴¹ *Ibid*, p. 24.

Conclusion

This environmental history of a coal mine in Clackmannanshire was undertaken with the premise that conceptions of contemporary edgelands, while descriptive of a given place at a particular moment in time, did not quite capture their enigmatic nature. In part, edgelands have remained elusive because up to now, their origins have been mysterious and their evolution has not been explored. Arguments could be made that any culturally created landscape has a story concerning its origins and then undergoes change; that change in and of itself cannot define a space. Just because an environment undergoes transformation does not make in an edgeland. Otherwise, could not any place be designated an edgeland? What the story of the transformation of the environment at the former Devon Colliery reveals, however, is that there are particular qualities that define the ways in which edgelands are established, maintained and perpetuated. These qualities are revealed through the four themes examined for the former Devon Colliery: landscape change, management practice, environmental quality, and response to regulation.

In the present day, the landscape at the former Devon Colliery would qualify as an edgeland, according to Shoard's current definition. It is located on the edge of several settlements but remains hidden from them. While the portion of the space now in use by the Scottish Society for the Prevention of Cruelty to Animals (SSPCA) does serve a specific purpose, it is possible to wander the site purposelessly without encountering signs of their occupancy. The River Devon straggles along the boundaries of the site, yet one can see beyond its haphazard banks to the Ochils beyond. However, the ambiguous qualities of this landscape can be better understood by examining its evolution. Edgelands are landscapes such as the former Devon Colliery that have evolved through the attempt to resolve the tension between nature and culture, including struggles between agriculture and industry common to spaces that are neither wholly rural nor wholly urban. The notion that

industrialization creates tension with the environment is not an argument unique to edgelands. However, in an edgeland environment, this tension is not fully resolved one way or the other. While the Devon Colliery site did become fully industrial after 1880, it could never escape the tension between itself and its more scenic surroundings.

Landscape change naturally was the product of the management of the Devon Colliery. Present-day management of the site of the former colliery have proven to be an interesting mix of attempting to ensure the sustainability of its environment while preserving its legacy. Although the site has been mitigated and the tenancy of the SSPCA gives it a purpose, this purpose is compatible with its edgeland status. The SSPCA needs a space such as the former colliery site which is neither urban nor completely wild. Although Shoard would argue that the site is less of an edgeland because various local authorities' "human hands" have transformed it, the fact that any edgeland site was at one time created by anthropogenic activity needs to be taken into consideration. Once again, the definition of an edgelands can be expanded to include the idea that they are places that have evolved through attempts to resolve various dilemmas. In the case of management practices, the central dilemma creating the edgeland is the question of whether profits or protection of the environment are paramount. As with landscape change, this dilemma is addressed in different ways at different points throughout the history of the site and is rarely definitively resolved. Managers at Devon Colliery could never escape the possibility of profit loss due to environmental damage, no matter how little they cared that they were destroying the environment. From fires to charges of subsidence damages from orders to address coal washing pollution, Devon Colliery management always faced the cost of their impact on the environment. The environment they created never allowed them to resolve definitively the dilemma of profit versus pollution for very long.

Management practices naturally resulted in the varying degrees of environmental quality found at the site. Shoard's notion of edgelands as wasteland can be slightly misleading without a clear definition of a wasteland or its origins. Currently the soils of the former Devon Colliery reveal some evidence of heavy metals, but they are not at significant levels to be considered contamination and the elements that are present are those associated with the presence of coal. On the other hand, the physical characteristics of the soil indicate poor quality and a limited functionality. Edgelands, then, should include places such as the Devon colliery site which present ambiguous evidence of possible past contamination or that would be limited in their purpose by their soil quality. The present edgeland status of a site as defined by its environmental quality should also take into account its legacy as a wasteland over the course of the past two hundred years. While the traces of copper, zinc, bismuth and arsenic currently found in the site's soil could have been there along with the coal in 1792, the disturbance of the site by mining activity over the next two hundred years could have exposed these elements in ways that would not have occurred naturally. In other words, the site could have been a contaminated wasteland until mitigation in 1977 removed, redistributed or buried the exposed heavy metal pollution. Disregarding the historic environmental quality of a site in determining edgeland status means missing out on many layers of ambiguity, yet ambiguity is one of the key distinguishing characteristics of any edgeland. The fact that the precise nature of the environmental quality of the former Devon Colliery site in the present day is difficult to determine is a consequence of past human activity there; hence the past should be taken into consideration when determining the edgelands designation of a site.

Ambivalence about the importance of the environmental quality of edgeland sites as well as their isolated locations has made regulation of them difficult. Shoard argues that edgelands should remain unregulated or risk becoming something else, but in fact the current

regulation of the site of the former Devon Colliery has allowed it to remain an edgeland. Regulations in the 1970s brought about its mitigation, but the results of that mitigation remain slightly ambiguous. The more recent regulatory push for sustainable development was interpreted by the Clackmannanshire District Council as sustaining the past, rather than creating something new to sustain, thus perpetuating the site as an edgeland into the future. Again, however, the present only tells part of the story. Past regulation or lack thereof is even more revealing for the reasons why the site remains an edgeland. At the Devon Colliery, the internal management of the site allowed it to remain isolated from the surrounding communities, making it easy for them to ignore its regulation. If the lack of outside oversight is a hallmark of contemporary edgelands, it should also be considered as part of what created the edgeland in the first place. In terms of regulation, then, edgelands are places whose present day environmental characteristics are shown to be part of a longer-lasting pattern of disregard. This, however, does not mean that all edgelands are necessarily derelict locations. The key is the tension between the regulations and the extent to which they are applied to locations which the public has found easy to ignore.

Using a coal mine located in Scotland's smallest local authority to expand the concept of edgelands could beg the question of whether or not the lessons learned from the story of the Devon Colliery can be applicable beyond their local context. However, the site is significant nationally for its longevity as a mining centre, allowing the edgelands idea to be traced from the early years of industrialization, into its heyday and on into its decline and eventual extinction. Furthermore, the fact that the general evolution of the Devon Colliery has been shown to follow national trends not only of industrialization, but also pollution regulation and response means that ideas about its evolution as an edgeland might also be a part of a larger pattern. The creation, maintenance and perpetuation of edgelands sites should not be unique or limited to Clackmannanshire. Sites of former industrial activity in similar

areas not quite definable as either urban or rural could also qualify as edgelands, were the definitions created utilizing the history of the Devon Colliery to be applied.

As industrialization continues to spread across the globe, the concept of edgelands is important in two ways. The first is that, as industrialization spreads, it becomes more of a rural issue, especially throughout the developing world.¹ As soon as the juxtaposition of agriculture and industry is put in place, the tensions associated with edgelands formation begin. From there arise the aforementioned dilemmas of profit, pollution and regulation. Having a better understanding of the dynamics of edgeland development could serve to call attention to the possible consequences of rural industrialization. The second way in which edgelands are important in an international context is that industrialization in the developing world corresponds with deindustrialization in the developed world. Deindustrialization is part of an international trend, thus the edgelands that result from it are an important part of this legacy internationally. Because the legacy of deindustrialization expands the context for edgelands far beyond Clackmannanshire, Scotland, there is a corresponding need for the development of management practices suitable for their legacy. Such practices need to find a way to maintain some of the tensions and ambiguities that define edgeland spaces while also allowing them to be environmentally safe enough to allow public interaction with them. Understanding the evolution of these sites is critical for discovering the unique details of the dilemmas which need to be preserved as part of edgelands legacy.

The industrial heritage of Scotland must now also take into account the legacy of deindustrialization. In some strange way, the efforts by the Central Regional Council and the Clackmannanshire District Council to rehabilitate and repurpose the site of the former Devon Colliery has done just that. The beam engine house remains as an artefact of industry, but the fact that it does not currently have a use is a reminder of the uncertainty in the future that is

¹ See, for example, T. M. Dak, *Rural Industrialisation: Challenges and Perspectives* (New Delhi, 1989) and M. Soundarapandian (ed.), *Rural Industrialisation: Problems and Prospects* (New Delhi, 2004).

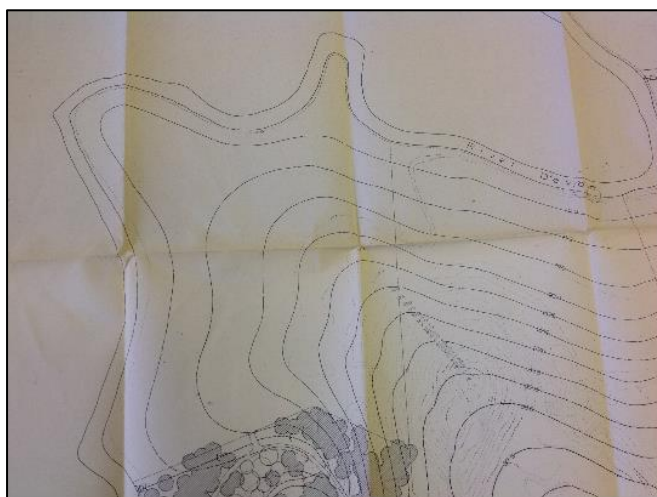
often associated with deindustrialization. The bing is gone, but underneath remains the visible pollution: the coal and the brick debris, alongside the invisible copper and zinc, arsenic and bismuth. Such contrasts between what can be seen and that which can only be imagined create the tensions which have allowed the Devon Colliery edgeland to remain an edgeland.

Appendix A Procedures for core sampling and testing

In order to measure heavy metal concentrations as well as sediment analysis, four, 40 cm soil cores were taken from the site of the former Devon Colliery bing using a golf hole corer (Tacit CT hole cutter, Tacit Corp., Rugby, Warwickshire). A transect determining the location of these cores was made using the mitigation plans for the bing prepared by the Central Regional Council in 1977. The transect took into account the possible location of a previous slurry and/or cess pool at the base of the slope. It also intersected both with places where the bing had been located at its steepest points and the area into which it was redistributed during the mitigation process. The four cores were taken at 75 m intervals along this transect. Core 1 was located at NS 8952 9605, core 2 at NS 8959 9607, core 3 at NS 8967 9610, and core 4 at NS 8975 9610.



Transect of cores



Map of the planned mitigation of the Devon Colliery bing

Cores 1 and 2 were determined to have the most scientific interest, as they were taken from the area into which the upper reaches of the former bing would have been redistributed. This

could mean that any possible heavy metal pollution could have migrated down the slope of the bing through natural causes such as erosion or leaching. Additionally, since the processing of the coal in the washing plants and settling tanks would have taken place at the pit head located at the top of the bing's slope, material from this location could have contained the greatest concentration of pollutants. During mitigation, this material could have been redistributed to the location of cores 1 and 2 as the height of the bing was lowered to conform to regulations stipulated by the 1969 Mines and Quarries (Tips) Act. Finally, these two cores could have been affected by various changes in the River Devon's morphology, due to silt left behind by coal washing, periodic flooding, (Tipping, personal comment 2014) or dredging which is known to have taken place in the 1940s.

Cores 1 and 2 were subsampled at 2 cm depth intervals. The resulting samples were then analysed using OSL/IRSL (SUERC, East Kilbride, South Lanarkshire) to assess their relative chronological age at the time of deposition; in other words, to determine if there exists any evidence of disorder in the relative age of the sediment layers. According to Sanderson and Murphy's 2010 study of the efficacy of OSL/IRSL, measurements obtained by this method "were extremely useful in helping to understand the depositional mechanisms and in identifying sediments with significant residual signals at time of deposition" (Sanderson and Murphy 2010, p. 299). In other words, the method is justified for use in a study such as this in which determining the possible sequence and impact of environmental dereliction is one of the key aims.

Cores 1 and 2 were also analysed for their physical characteristics by hand. Note was made of the subsamples' colour, texture and particle size at each sample depth. The subsamples were then grouped according to these factors into four blocks at the depths of 10, 22 and 36 cm and used to determine soil quality in a very general way (Karlen 2003; Northcutte 2002).

Finally, elemental analysis was completed using XRF (Niton XL3t GOLDD+, Woodmancott, Winchester). XRF has been used to analyse historic waste from metalliferous mines. However, its application to the analysis of historic coal waste is almost non-existent in the literature, making its use in this study an important additional contribution to understanding the legacy of environmental quality from the industrial past.

Concentrations of forty elements were measured as indicators of heavy metal pollution associated with mine waste. Possible pollutants could include copper, zinc, cadmium, manganese, aluminium, and elevated levels of iron. Indications of phosphorus could be accounted for by human and animal waste, as the Devon Colliery site has been used for horseback riding as well as grazing in the past 35 years. XRF results were then analysed using descriptive statistical methods to discover areas of detectable concentrations. Finally, these results were compared against the visible physical characteristics at corresponding depths in order to account for the existence of trace amounts of certain elements associated with coal mining.

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